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Two 500-Bbl. A.P.I. Maloneys in East Texas

Leases equipped with Maloney *Vapor-Pressure* Tanks make more money because these tanks are built to Save Your Oil

ANYTHING that eliminates waste between the wells and the pipeline is certain to increase your income from the lease. Maloney *Vapor-Pressure* Tanks do just that. They restrict the movement of vapors, maintain the well gravity and volume of the crude and enable you to sell more and better oil from the same production.

A study of our *Vapor-Pressure* construction makes it obvious why these tanks save your oil and stand up through exceptionally long service. Included in the specifications of our *Vapor-Pressure* Tanks are: 12-gauge (or heavier) rust-resistant Keystone Copper Steel; heavy 2-inch angle ties and reinforcements; wide gussets on ties and ladders; efficient combination valves operating at 16 ounces pressure and ½-ounce vacuum; and our special aluminum paint, made with a spar vehicle containing waterproof and alkali-proof Inhiburine.

"Alone in Quality"

MALONEY TANK MFG. CO.
38 N. Peoria Ave., Tulsa, Oklahoma
Distributers at All Principal Petroleum Points
Packed in Steel-Bound Crates for Export

MALONEY PATENTED BOLTED COPPER-STEEL TANKS

Oil Industry Adjusting Itself to Taxes

Highest production in 1931, week ending Aug. 8, average daily output 2,551,807 bbls. Peak of U. S. production, week ending Aug. 24, 1929, average 2,975,435 bbls.

Price Structures for Crude and Refined Oils Stiffen as Result of Passage of Federal Revenue Measure

By Andrew M. Rowley

Lowest daily average crude oil production in the United States during 1931 was for week ending Sept. 5, with average output of 1,736,007 bbls.

All divisions of the petroleum industry are busy adjusting themselves to the new conditions imposed by the Federal revenue bill signed on Monday of this week by President Hoover. That measure provides for an excise tax of 21 cents a barrel on imported crude oil, the same on fuel oil, four cents a gallon on imported lubricating oil, $1.05 a barrel on imported gasoline and for a tax of one cent a gallon on gasoline manufactured in this country or sold by the importer thereof. This makes the total tax on imported gasoline sold in this country $1.47 a barrel or 3½ cents a gallon. These taxes are in addition to a four cent tax on pipe lines.

The immediate and natural effect of the tax measure was to stiffen the price structures for crude oil and refined products.

Production of crude oil is being held at a stationary level and no material change is anticipated even though field operations have shown a substantial increase and more drilling is expected as a result of recent discoveries, such as that in the Conroe area of Montgomery County, Texas.

Consumption is increasing, although below the level of last year. The decline in requirements, as estimated by the economics committees of the Federal Oil Conservation Board and the American Petroleum Institute, should not prove to be a serious factor in the business for the largest of these estimates is about seven per cent. It must be remembered this decrease is from the peak requirements in the history of the petroleum industry. The oil business certainly should be able to adjust itself to this condition.

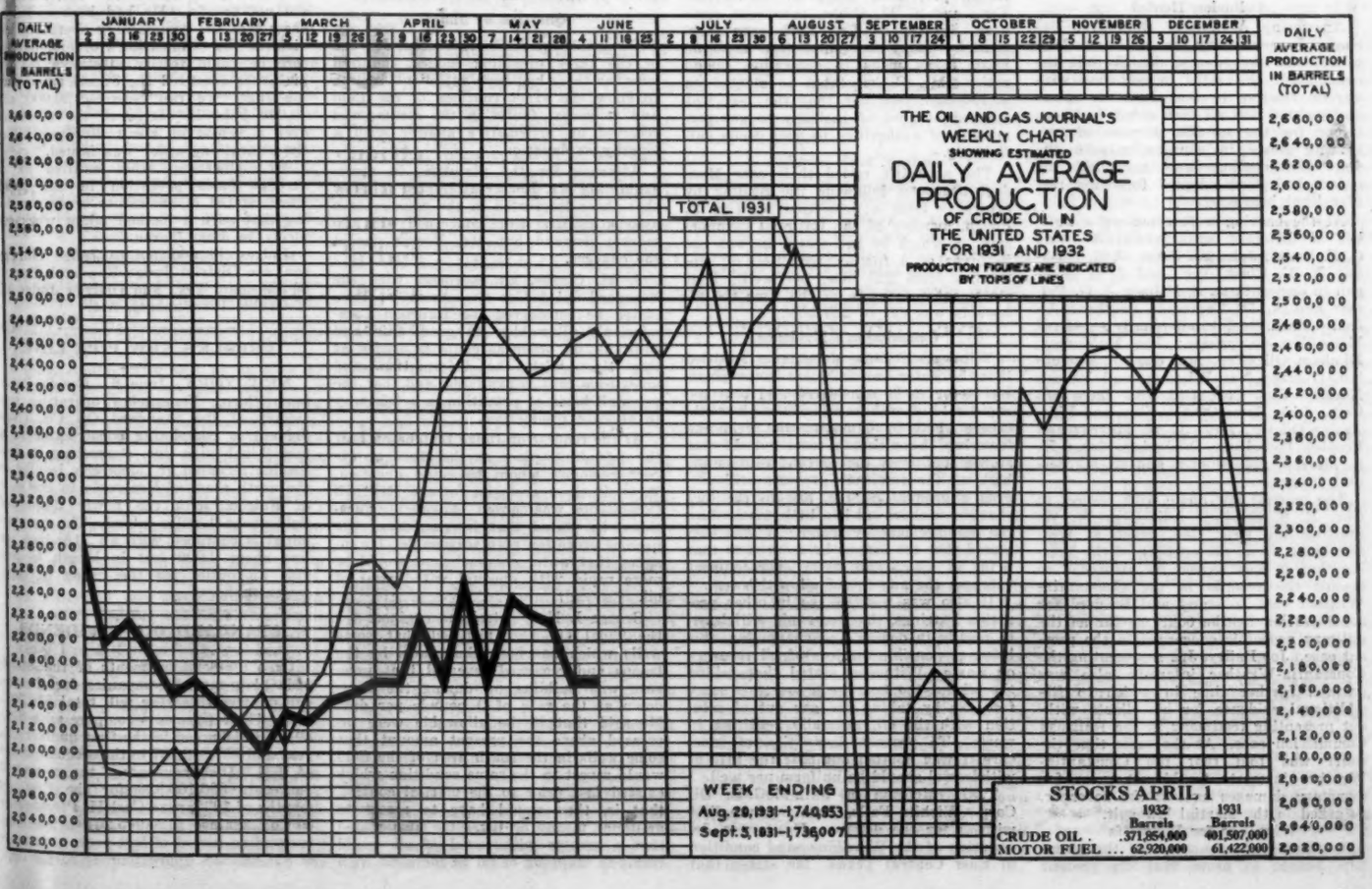
Consumption of gasoline would increase quickly if refiners centered their advertising on stimulating automobile trips. There are many interesting places to visit within easy driving distance of every community in the United States. Car owners are willing to make such drives if such trips are brought to their attention. The cost of gasoline for such trips would be no more than the admission charge to a motion picture show, yet if car owners increased their driving by 100 miles a week the petroleum industry would experience an increase in gasoline consumption this year.

CRUDE OIL PRODUCTION IN THE UNITED STATES

Estimated daily average production for the week ending June 4, and a comparison with previous week and one year ago follows:

	June 4	May 28	June 6, 1931
Oklahoma—			
Oklahoma City	74,145	81,445	174,920
Seminole-St. Louis	116,910	105,310	139,615
Remainder of State	216,480	211,860	237,605
Total Oklahoma	407,535	398,615	552,140
East Texas—			
Lathrop	129,240	125,870	66,700
Kilgore	109,395	102,315	165,600
Joiner	111,287	106,580	119,200
Total East Texas	349,922	334,765	351,500
West Texas	184,787	184,740	211,236
North Central Texas	74,052	77,655	79,408
Texas Panhandle	54,428	52,935	60,046
East Central Texas	56,819	57,110	56,750
Gulf Coast Texas	109,615	109,740	141,550
Southwest Texas	59,635	59,420	65,750
Total State of Texas	889,258	876,365	966,240
Kansas	95,815	96,720	106,750
North Louisiana	29,100	29,250	37,770
Gulf Coast Louisiana	34,725	40,035	30,200
Arkansas	34,030	34,285	45,705
Eastern fields	118,000	118,000	110,000
Rocky Mountain area	81,442	85,055	97,468
California—			
Santa Fe Springs	60,500	61,750	69,000
Long Beach	76,000	78,000	84,000
Playa Del Rey	17,250	17,750	30,000
Elwood	14,250	15,000	35,500
Kettleman Hills	59,500	57,000	44,000
Remainder of State	252,500	260,500	265,000
Total California	480,000	490,000	527,500
Total United States	2,169,905	2,168,325	2,473,773

→ Increase, 1,580 Bbls. Daily ←



Federal Hearing on East Texas Order

Testimony at Houston Before Three-Judge Court on Suit Against Commission's Enforcement of Proration Regulations

By Neil Williams

HOUSTON, Tex., June 6.—With the conclusion of the hearing before a three-judge federal court here May 30-June 1 of the suit of the group of East Texas operators who are contesting the enforcement of proration orders by the State Railroad Commission against their respective properties, a period of 30 days was granted the attorneys in which to file their briefs. The first 15 days were allowed the plaintiffs in which to present their case with the remaining 15 days being given the defendants in which to answer. It will not be until after that period that the judges will hand down a decision.

This case is a sequel to the one heard here before the same judges last January in which J. D. Wrather and E. Constantin as plaintiffs obtained an injunction against martial law regulation of production. At that time the question of the Railroad Commission authority did not come up and since then the field has been controlled under orders issued by the civil authorities. In the meantime the martial law decision has been appealed to the United States Supreme Court.

In the suit against the Railroad Commission the plaintiffs are seeking an injunction against the enforcement of orders issued by that body. In opening the hearing they contended that the orders as issued are arbitrary and unreasonable and a violation of constitutional rights as guaranteed by the Fourteenth Amendment and also a violation of the interstate commerce laws. S. A. L. Morgan, representing the plaintiffs, in outlining the case at the opening of the hearing, maintained that the plaintiffs are not bound by such orders.

Collusion Denied

Answering, Asst. Atty. Gen. Fred Upchurch, representing the Railroad Commission as defendants, denied that the commission had acted in collusion with anyone relative to the proration orders and insisted that all such orders had been issued for the specific purpose of preventing waste in conformity with the state conservation laws and that the orders had been adopted following regular legal hearings.

At the hearing were combined a number of different suits, plaintiffs being C. F. Smith, John W. Greer, J. S. Rushing, J. W. Clark, Inc., and J. H. Morgan in one suit; A. S. Palmer, J. G. Palmer and A. H. Tarver in another; Alfred Macmillan, individually; Alfred Macmillan as trustee; Jim McMurray, Dimham Oil Corp. and Gordon Macmillan, trustee; Nat Wissman and Pelican Natural Gas Co.; Bill and Dave Oil Corp., Lide Rowe Oil Co., Inc., and Lide-Tayloe Oil Co., Inc.; T. W. Murray and Peoples Petroleum Producing, Inc.; K. E. Merren, individually, and K. E. Merren, trustee.

The martial law angle with respect to Gov. R. S. Sterling, Adj. Gen. W. W. Sterling and Brig. Gen. Jacob F. Wolters came up at the opening of the hearing, but it was agreed by attorneys to permit the records in the Constantin-Wrather case to stand and be used for consideration by the court so far as the military aspect is concerned in the present case. Joe Bailey, Jr., representing the Constantin-Wrather interests, also was granted further time in which to file additional evidence for his clients without presenting testimony in the Railroad Commission case. At the same time the court was told that the Constantin-Wrather interests would not press for monetary damages against the governor, as asked in the martial law suit.

Witnesses for Plaintiffs

Testimony of witnesses for the plaintiffs sought to prove that the present method of restricting production in East Texas creates material waste instead of preventing waste. It was stated that wells of the plaintiffs drilled by approved methods could produce as much as 1,500 to 2,000 bbls. daily without waste. The witnesses maintained that in opening their wells to obtain their respective allowables a substantial amount of gas was lost which otherwise would not occur if wells could produce larger amounts of oil and flow more steadily. They also contended that closing of the wells or flowing them at such a low rate of production results in clogging of the wells and flow lines with paraffin which necessitates swabbing the wells back in frequently with consequent loss to the operators.

David M. Lide, Shreveport, La., president of the Lide-Rowe Oil Co., Inc., was the first witness for the plaintiffs.

"It is impossible to prevent waste under the present allowable of 59 bbls. a day," he testified, explaining that some of his wells are going dead. "Paraffin chokes up the flow lines. We have to close the wells for part of the day and frequently have to swab them back in. When we open to produce the allowable gas escapes. From 20,000 to 25,000 feet is wasted. Whenever the wells are cut below 200 bbls. a day they go dead. The flow is so slow that there is a lot of gas and less oil than normal flow."

Mr. Lide testified that the oil produced from his company's wells has been sold to interstate pipe lines and not to Texas companies for consumption in this State.

Two additional witnesses placed on the stand by the plaintiffs were Ray Donatham, petroleum engineer, Henderson, Tex., and T. H. Gibbs, petroleum engineer, Shreveport, La. Both gave technical testimony concerning tests made on East Texas wells to determine gas-oil ratios. Mr. Gibbs stated he started on a 100-hour test but that the test was stopped because of inability to get permission of authorities to open wells sufficiently.

The plaintiffs rested their case Monday afternoon following the reading by attorneys from a deposition by Lon A. Smith, member of the Railroad Commission, in which he had stated he was not in favor of a further reduction of production from 225 bbls. per well. That statement was made at the time the allowable was cut to 225 bbls.

Commission's Evidence

Witnesses for the defendants testified that the water encroachment is the greatest factor to be considered and that too rapid rate of withdrawal of the oil would create waste by damaging the field and lowering the ultimate recovery. It was stated that even the present rate is too high as the reservoir pressure still records a gradual decline, due to the fact that the withdrawal is a little faster than the displacement by water. It was suggested that the output be reduced to that point at which the water encroachment balances the amount of oil withdrawn.

It also was testified, as in other proration hearings, that too rapid withdrawal results in coning and channeling, this being responsible for loss of oil recovery or waste. Witnesses stated that taking the oil out too fast tends to create more free gas by taking the gas out of solution with the oil, generally resulting in waste. To prevent dissipation of pressure it was pointed out that the rate of withdrawal should be uniform per well.

T. B. McGaha of Fain-McGaha Oil Corp., Wichita Falls, Tex., was the first witness for the defense. He gave a description of the Woodbine sand condition in East Central Texas. He stated that half the East Texas Field has water underlying it with the water coming in from the west moving forward over a large portion of the field. He stated that hydrostatic pressure is sufficient to lift the oil to the surface without the use of the gas but that at present the reservoir pressure is dropping off gradually because the oil is being produced at a little faster rate than the encroachment of water. He also explained the creation and waste of free gas released if the oil were taken out too fast before the head of water had time to displace it. In answer to questioning, he testified that the rate of pressure decline in the reservoir had been materially reduced as a result of curtailed production.

Mr. McGaha was followed by W. F. Knode, petroleum engineer in the employ of the Railroad Commission, who testified as to wells which had been ruined by water encroachment as a result of overproduction of oil, and also as to the decline in reservoir pressure. He was of the opinion that proration on a per well basis is an equitable manner of withdrawing the oil.

Charles F. Roeser of Fort Worth, president of the Texas Oil and Gas Conservation Association, testified he considered the present allowable of the field too great and that it should be reduced to an amount which would maintain reservoir pressure. He declared that when the troops closed the field, the pressure was dropping at the rate of 2 pounds for every million barrels of oil withdrawn, while now the decrease is only .6 of a pound for each million barrels. He added that when the shutdown came there was a migration of pressure to points where the withdrawal had been the greatest.

Question by Judge

Circuit Judge J. C. Hutcheson, Jr., one of the three presiding judges, inquired whether there had been sufficient drilling to show the exact confines of the field and to reveal faults in the strata, and received an affirmative answer with a lengthy explanation.

Attorney for the plaintiffs in cross-examining Mr. Roeser attempted to show that those interested in the conservation association first were concerned with the market demand but Mr. Roeser denied the charges.

J. H. Clarke, an executive with the Standard Oil & Gas Co., Amarillo, Tex., stated he considered the Railroad Commission's allowables as good, fair and equitable an order as could be issued at this time with the information and knowledge that is available, and that the per well basis of proration is a fair way to allocate production.

At the request of Judge Hutcheson that the defendants place on the stand an expert geologist whom he could question, E. O. Buck, a geologist for the Railroad Commission was chosen. Answering questions, he stated that he considered the present proration plan reasonable. He insisted that water encroachment would be more rapid with unequal withdrawal of oil.

George I. Nye, petroleum engineer for the Tidal Oil Co., testified that some wells which has been shut down by the troops and reopened revealed that pressure was building up during the shutdown at the rate of 9 pounds per day. He said that if the allowable were increased above the present amount that some wells in the south area of the field would revert to the same condition which existed just prior to the martial control, that is, they would have to resort to artificial means of lift. He also stated that a greater withdrawal of oil would result in trapping of oil in the sand with a material waste and decrease in the ultimate recovery.

R. J. McMurray, another defense witness, told about one of his wells which had been produced at an excessive rate prior to the martial law shutdown and which went dead. After the well was opened under supervision of the authorities it came back to its normal flow. Mr. McMurray expressed the opinion that if the well were opened again it would go dead as before.

K. B. Nowels, petroleum engineer, testified as to the importance of maintaining water pressure. Natural water drive can accomplish more satisfactory results in lifting oil than can be realized by artificial means, he stated.

Demonstration in Court

One of the features of the hearing was the demonstration of conditions in East Texas by E. V. Foran, consulting engineer, who used a glass inclosed model of the field. For the demonstration, East Texas sand had been packed in the box in as nearly natural position as possible and had been saturated with oil. Water was injected into the sand at the lower side and as oil was drawn off at the other side the effect of the water encroachment was noted.

A number of other witnesses, including R. D. Parker, chief supervisor of the oil and gas division of the Railroad Commission; D. F. Gordon, Arkansas Natural Gas Co.; Ralph Arnold, consulting engineer, Los Angeles, Calif.; M. Albertson, Shell Petroleum Corp., and H. M. Hornsby, oil and gas division of the Railroad Commission, were called by the defendants. With the exception of the latter, each gave similar testimony as had been given by others. Mr. Hornsby did not testify. He had been called to show that the complaining operators had violated the commission's orders, but before he could testify attorneys for the plaintiffs admitted the excess runs, stating that "we ran between 30,000 and 40,000 bbls. in excess of the allowable over a period of about 30 days before the restraining order was issued."

Mr. Albertson, who testified as to acreage basis proration in the Yates Field, stated in answer to cross examining that such a method might work out nicely in East Texas.

Judges, in addition to Judge Hutcheson, are District Judge Randolph Bryant of Sherman, Tex., and District Judge W. I. Grubb, Birmingham, Ala.

CREOLE'S NEW PIPE LINE

NEW YORK, June 6.—Creole Petroleum Corp., Venezuelan operating subsidiary of the Standard Oil Co. (New Jersey) is completing construction of a new 6-inch pipe line, connecting its new loading terminal at Cumarebo, located on the north coast of Venezuela in the state of Falcon, with the newly discovered field about 3 miles inland. The new terminal is equipped with an 11¾-inch sea line about 4,000 feet in length to provide an outlet for the crude to deep-water tankers.

STANDARD OIL DIVIDENDS

Cash dividend payments of the Standard Oil group of companies for the second quarter this year will total $46,308,873. These payments compare with $46,801,053 disbursed in the first quarter this year and $57,843,467 in the second quarter of 1931. Disbursements of the group will aggregate $96,109,926 for the first six months of 1932, says Carl H. Pforzheimer & Co., against $120,945,264 in the corresponding period of last year, a decrease of $27,835,338, approximately 23 per cent.

Discuss Plans To Lower Gasoline Tax

A.P.I. Marketing Division Favors Active Campaign in States to Reduce Present Excessive Rates. Federal Tax Adds to Burden

By C. O. Willson

Representative marketers of petroleum products believe the time has arrived when the oil industry must take the leadership in a program to reduce taxes on gasoline.

The apathetic policy of the past which at best has aimed only at the prevention of higher taxes must be supplanted with a well-directed campaign of consumer education which will result in a revolt against the constantly mounting burden of gasoline taxation and bring the rates down to the levels where they are not a threat to the propserity of all branches of the oil business.

This plan of action crystallized as the result of meetings of the marketing division of the American Petroleum Institute which held its semiannual meeting in Tulsa last week. The two-day program was devoted to the discussion of the marketing practices and practically every paper pointed to the high gasoline taxes as the source of major problems with reductions necessary before those charged with the distribution of motor fuels can hope to successfully cope with many of the evils now common to their operations.

The certainty that before the end of the month an additional 1 cent Federal tax will become effective coupled with a 4-cent per gallon tax on lubricating oils, a development which became known during the meetings aided in rallying support for an aggressive campaign for a reduction in taxation on the industry's principal product. The 1-cent Federal tax on gasoline came as a surprise to leaders of the marketing division assembled at the semiannual meeting. Under the auspices of the American Petroleum Institute, the position of the industry in regard to the tax had been presented before committees of Congress considering revenue measures several weeks ago and it was thought there was no danger of a Federal tax on gasoline during the present session. The last-minute necessity of finding means for raising additional revenue brought a sudden change in this situation and the industry did not have the opportunity of again presenting its objection to a tax already excessive in a large majority of the states.

Two Million Daily

With the 1-cent additional tax gasoline consumers in several states will be paying a sales tax of 8 cents per gallon on all their motor fuel purchases. Including city, county and parish taxes, the rate in some communities will be as high as 10 cents per gallon or more than twice as much as the average refinery price at this time which represents the industry's share of the consumer price. With the 1-cent Federal tax consumers for the entire United States will be paying approximately $2,000,000 per day in gasoline taxes, a sales tax which it is said has never been approached in size with any tax imposed on a major commodity.

"If you think you have been having trouble with these state gasoline taxes, just wait and see what happens when this 1-cent Federal tax and the 4-cent tax on lubricating oils become effective," warned Frank V. Martinek, assistant vice president of the Standard Oil Co. (Indiana) and chairman of the Central States Tax Evasion Committee, which has been endeavoring to cope with the gasoline tax evasion racket in several middle western states.

Mr. Martinek predicted that the Federal tax will widen the scope of the evasion and pointed to the collection of the lubricating oil tax as offering a new phase of the evasion problem which will be particularly difficult to handle. He declared E. W. Sinclair, an active executive of the Consolidated Oil Corp. and its subsidiary, Sinclair Prairie companies, "The high rates, out of equitable proportion to the price of gasoline are a menace to the present and future welfare of the industry. It is entirely conceivable that even a reasonable increase in the price of gasoline plus a tax beyond a fair relation to the price of the product may make the aggregate cost to the motorist so high that it will materially affect consumption."

The two phases of more evasion and reduction in consumption were the angles of most concern to the distributors. It was pointed out that the evasion evil by enabling bootleggers to undersell the legitimate distributors, makes it impossible for the industry to establish consumer prices in line with the cost of consumption.

In regard to consumption it was stated that the recent decrease in domestic consumption was partially due to the high taxes and with the additional 1-cent Federal tax the workings of the law of diminishing returns will become more and more apparent. Data were presented showing that several states with the largest gasoline taxes, had shown the greatest decrease in consumption in recent months.

Consumer in Revolt

Several who are in close touch with retail markets expressed the opinion that the time is ripe for a direct appeal to consumers for a reduction in taxes. The popular revolt against all increases in taxation, it was predicted, can be directed to include motor fuel rates, the total cost of which has never been appreciated by the consumer.

Legislatures in 40 states will be in session within the next year and in most of these states, bills calling for higher rates will be introduced in order to raise revenue for a wide variety of state expenditures. In this connection, Burton M. Musser, a state senator of Utah, in a most complete discussion of the gasoline tax evil, presented figures showing that the trend toward using gasoline tax funds for purposes other than the building and maintenance of improved highways, was spreading rapidly.

It is proposed to meet these plans for higher taxes, with bills calling for the reduction in rates already in effect. It is believed that this action if properly supported by the marketers within the states will not only prevent the higher rates becoming effective but will mark the start of a program for lower rates. It was stated that in some states plans are under way to bypass the legislatures and carry the program directly to the people of the states through the medium of popular vote. In Oklahoma, a bill is being initiated calling for a reduction in the rate from 4 cents to 2 cents. Although no rate was agreed upon, representative opinions indicated that the rate should not exceed 3 cents including the Federal tax of 1 cent.

In addition to the business sessions of the marketing divisions held Thursday and Friday, meetings of those in charge of state and regional tax evasion work were held at Tulsa last week. Reports showed that in many sections there was progress in curbing the activities of gasoline tax evaders. At the same time the practice, as a racket was becoming better and better organized. The necessity of co-operation between the states in handling interstate shipments was stressed. Refiners were urged to aid in handling this phase of the problem.

EXCEPT FOR THIS IT IS SATISFACTORY

Burton W. Musser, state senator from Utah had the following to say regarding the gasoline tax at the A. P. I. meeting last week:

"The gasoline tax should be reduced because at its present rate it directly induces gas tax evasions and gas tax fund diversions, and makes the blending and sale of inferior products profitable.

"It breaks faith with the motorist, lessens the use of the automobile, destroys industries, encourages the thief, postpones economic recovery, gives a premium to the bootlegger, destroys the automobile, penalizes the honest distributor, corrupts the office-holder, demoralizes the dealer, debauches the administrator, makes a sneak-thief out of the night-rider, a perjurer out of the exemption claimant, and a spendthrift out of the highway commissioner.

"And, furthermore, it produces too much money for the purposes for which it originally was, and now is, imposed."

and other speakers called for greater co-operation on the part of the marketing branch of the industry in coping with the bootlegger whose operations soon will be 25 per cent more attractive due to the additional 1 cent tax.

Probably at no meeting of the petroleum industry have the evils of taxation, particularly gasoline taxes, been more thoroughly aired than they were at the business sessions of the marketing divisions. Every angle of the problem in its relation to the oil industry were discussed with exhaustive data presented which left no doubt that the reduction of these taxes is a program of major importance which merits the support of everyone connected with the industry either as an employe or investor.

Cause of Evasion

"The unreasonably high rate of taxation is the direct cause of tax evasion,"

MARKETERS CONSIDER PROPER BASIS FOR GASOLINE CONTRACT

The ever recurring problem as to the proper basis for contractual relationships between refiners and jobbers in the sale and purchase of gasoline was discussed at the final session of the marketing division of the American Petroleum Institute which held its semiannual meeting in Tulsa last week. This problem which is of particular importance to Mid-Continent and Middle West areas where the guaranteed marginal contract has had its widest application, is of special interest at this time because it is apparent some new type of agreement will be necessary within the near future. It was stated that the contract adopted by many refiners last year based on a 5½-cent maximum and 4½-cent minimum margin between the delivered tank car price and the service station price with buyers and sellers sharing equally any spreads in excess or below these minimum and maximum provisions, based on open tank car prices, has not proved generally satisfactory and a new type of agreement is desired.

The informal discussion which took place at the Tulsa meeting attended by representative refiners in the Mid-Continent and Middle West brought forth substantial variations in opinion as to what should be the future policy, with criticisms of past practices. From the discussions it was apparent there are in general two schools of thought in regard to tank car sales. One division favors the continuance of the marginal contract based on the service station or tank wagon prices in which the jobber is guaranteed a certain minimum margin on which to operate.

In the past this type of agreement usually has permitted the jobber to purchase on a spot market basis when that price was lower than the minimum of the contract. The 4½-cent minimum and 5½-cent maximum contract previously mentioned provided a limitation to this type contract in which the refiner was protected with the 5½-cent provision. Many jobbers, however, have refused to sign this type of contract and have been able to obtain concessions from their refinery sources of supply. A new type of contract was suggested at the meeting in which the cost of gasoline production was taken into consideration with variations in prices based in part on posted crude oil schedules.

Favors Spot Market

The failure of all types of marginal contracts to satisfy both buyers and sellers has caused a number of refiners, including some of the larger operators, to favor the discontinuance of all marginal contracts and the establishment of a market based entirely on the open market quotations for gasoline at refineries. At the Tulsa meeting it was pointed out that in effect this so-called spot tank car market was the dominating factor in the refiner-jobber relationship, the refiner generally finding it expedient to give the jobber the benefit of the tank car price when it was more favorable than the contract price. It was said that under the present method of operation most refiners contract practically all of their output and let the spot market be determined by a relatively few sales coming largely from refinery operators who have no regular outlets and for that reason sell at the lowest prices.

It was contended, if more emphasis was placed on the open tank car market with greater participation from day to day by the larger refiners, this going market would cease to reflect only the low-priced sales and a healthy market situation would be established. The proponents of this plan of relying on the spot market instead of marginal contracts declare that it will not work any hardship on their jobbers because all will be on an equal basis. The same situation would obtain in regard to refiners' own marketing outlets.

No definite recommendations were adopted at the meeting of the marketing division.

Should the C. F. R. Method of Determining Knock Be Revised?

Many Refiners Not Convinced More Severe Test Justified

By W. T. Ziegenhain

THE following papers were delivered before the refining division of the A. P. I. during its convention in Tulsa, June 1 to 3. Other papers will be published in subsequent issues.

"Formation of Gum in Gasoline and Effect on Engine Operation by Dr. O. C. Bridgeman, of the U. S. Bureau of Standards; Page 55.

"Correlation of Knock Ratings in Fuel and Service Performance" by T. A. Boyd, of the General Motors Corp.; Page 58.

"Cracking Hydrocarbon Gases and Reforming Low Boiling Point Oils" by G. G. Oberfell and J. A. Guyer, of the Phillips Petroleum Co.; Page 62.

The admission that performance of a car on the road can not be accurately judged with respect to its tendency to knock by ascertaining the octane number of the fuel under the present laboratory method of antiknock determination, was not news to the refinery technologists attending the American Petroleum Institute meeting in Tulsa this past week but a suggestion to revise the present laboratory procedure so as to yield results more nearly in agreement with road tests, precipitated an avalanche of objections. These objections came from technologists of the Sinclair Refining Co., Cities Service companies, Pure Oil Co., Standard Oil Co. of Indiana, Standard Oil Co. of New York, The Texas Company, Sun Oil Co., and others. Their objections were based upon a wide variety of experimental data but these were no more convincing than the evidence presented by T. A. Boyd, of the General Motors Corp.; Dr. A. E. Becker, of the Standard Oil Development Co.; Earl Bartholemew, of the Ethyl Gasoline Corp.; and Dr. Graham Edgar of the Ethyl Gasoline Co., to the effect that the present test procedure is inadequate.

The discussion became so well defined for or against the change as to show evidence that the subject had been thoroughly discussed by all parties previously and two rather determined lines of thought and purposes had been formed to oppose each other. The immediate problem stated in general and simple terms is, "Shall we continue to determine the octane number of motor fuels using the C.F.R., or Series 30 Ethyl testing engines when operating at 600 r.p.m. and with a jacket temperature of 212° F., or operate these engines at 900 r.p.m. with a jacket temperature of 362° F.?"

The first and present procedure yields relatively high octane values on the majority of motor fuels and these results are fairly well in agreement with actual road performance of a majority of the 1932 model automobiles.

The second or proposed procedure yields results which are much lower and seem to penalize motor fuels containing cracked gasoline but these results reflect more accurately the performance tests on all cars.

The attitude of those who oppose the revision of the test is that the change is too severe and the refining industry would be penalized in all cases to satisfy irregularity of results shown in relatively few cars. It is probable that some intermediate set of operating test conditions may be agreed upon as a solution but as yet, too many variables seem to be clouding the issue.

Principal Objections

The objection which was heard most was that the proposed test was more severe than necessary. The proposed test was generally recognized as giving more concordant results but it was the views of those objecting that it penalized the refiner too much in order to get comparable results on relatively few cars. The Buick car was refered to as the one giving the greatest difference in road results from those of the laboratory. Its valve arrangement was said to influence this. The natural conclusion for the refinery technologists to draw at this point was that the motor manufacturer should design and locate the valves in a manner so as to lessen the cause of knock.

Another factor referred to as important in motor design in order to minimize knock is the shape of the combustion chamber. The refinery technologists found that recessed combustion chambers in which the path of the flame was deflected under the various designs of many types of motor cars, marked differences occurred in the knocking tendency of the motor. Again, it was the logical conclusion that an optimum headshape could be found.

Another pointed out the need of locating the valves at points where they will be cooled and the technologists cited specific instances where widely different results were obtained when using the same gasoline and under similar motor operating conditions except where valve temperatures differed through favorable and unfavorable design.

Wall Thickness of Cylinder

In a similar manner it was pointed out that cooling of the engine is a function of wall thickness and this in turn varies in different cars. The average wall thickness is said to be suitable for operating at 180° F. but temperatures considerably higher than this are encountered in practically all cars even under ordinary driving conditions and an improvement in this phase of motor design was suggested. Another important factor tending to cause a variance in the results of road tests and laboratory antiknock tests is the fact that the C.F.R. test procedure is based upon the operation of a single cylinder motor. The road test is conducted on cars having from 4 to 16 cylinders.

Because each of the cylinders in a multicylinder motor may be operating at a different power output, there will be different degrees of knocking even in the same motor. This is caused by the uneven distribution of fuel and the lack of consistency in the mixture ratio. As evidence to substantiate this, D. G. Brandt, of the Cities Service group, stated he had found the different cylinders of a motor operating at only 70 per cent of intended thermal efficiency and the test on the individual cylinders showed an efficiency something like, 71 per cent, 78 per cent, 84 per cent, 76 per cent, 75 per cent and 81 per cent. By making changes in the intake manifold the engine's efficiency when checked at the individual cylinders came within a range of 4 per cent and all were at or above 94 per cent.

Because such discrepancies occur in the present-day motors the refinery technologists felt that the motor car manufacturer could do much in straightening out the problem of knocking and getting consistent results as well as the refiner.

Automatic Spark Control

Automatic spark control has been generally adopted on the newer cars and has naturally aided in keeping the knock out of the motor but objections were raised to what was called "imperfect design." The statement was made that the control often lagged because of friction or momentum in the parts and that a curve of the spark control plotted against speed shows a jagged relationship in many cars. So, because of this failure to control the spark with exactness, some motor fuels will knock in some cars which do not knock in others even though the engines may be identical except for the spark control. This, however, was not given as much emphasis as other factors but was mentioned as another source of error.

Audible Knock

After all of the weaknesses in car design were enumerated with the idea of offering suggestions to the motor manufacturer in a co-operative endeavor to reach some end whereby the cause of knock may be more accurately traceable to the fuel rather than motor design, the question was raised, "What is a knock?" By this was meant that what one driver called a knock, another driver would not be concerned with. The sharp knock may be readily recognized but the slight ping so often heard might not be objectionable to the driver. The plea was made by J. B. Hill of the Atlantic Refining Co. to ascertain what the customer or consumer calls a knock. The customer might be satisfied having a slight ping in his motor in rounding a curve starting up a hill if he knew he was saving money on his gasoline bill over the month. Mr. Hill suggested that possibly the technologists were too critical in their own minds and were forgetting the economic side of the problem. Fitting well into the suggestion that the petroleum technologists consider the views of the motorist, E. B. Phillips, of the Sinclair Refining Co., outlined a test he has successfully used in comparing the knock of one motor fuel with that of another. The procedure calls for the evaluation of the particular fuel on the basis of the speed at which an audible knock ceases as the speed is increased and the speed at which it begins as the motor is retarded. The test involves the use of an arbitrary scale of values and also calls for a trained operator of the test car but the procedure meets the objections to the laboratory test and more nearly approaches the test the driver makes of the fuel in actual use.

Delay Acceptance of C.F.R.

Another factor which favored the continuance of the present test method was that if changes are made, the C.F.R. engine and procedure will not likely be readily accepted by the A.S.T.M. Dr. J. D. Rather, of the Standard Oil Co. of New York, called attention to this and intimated that the program of antiknock testing is clouded with doubt since a standard test procedure has not been adopted.

Economic Angle to Problem

While the discussion which arose during the meeting was confined to the problem of finding an equitable test procedure for the determination of the octane value of gasolines the division of opinions could not help but reflect the interests of the Ethyl Gasoline Corp., General Motors and Standard Oil Co. of New Jersey agreeing on one trend of thought and a majority of refiners on the other. The refiners view the proposed test procedure as meaning that they must use more ethyl fluid to meet competition. They also feel that cracked gasoline is penalized compared to Ethyl blends. The new procedure apparently favors natural gasolines in a similar manner. Just what position the respective companies find themselves considering these factors can not help but influence their efforts for or against the change. However, as time goes on, a common understanding is very likely and to arrive at that point simply means additional research in both camps. The technologists have always been ready to accept scientific results for their face value and their program has always been one of seeking truths. Whichever procedure is finally accepted or what modifications are made will probably be as the result of definite proof and what effect it will have on the commercial position of one company or another will have to be borne individually. Since the greatest portion of the discussion was focused on defects in the present motor design which the oil technologists feel can be corrected by the motor manufacturer a rather definite program can be given to the motor manufacturer when meetings of representatives of the automobile and refining industries are held. Then as changes and improvements are made from an automotive standpoint the problem of agreeing upon a laboratory knock test procedure should be simplified. That the autmoboile industry is making an effort to eliminate those factors which cause a knock is shown by the fact that despite an increase in the average head pressure or compression ratio in the 1932 model cars, the knock tests on these cars are in closer agreement with the laboratory test results than the cars of former years. If this trend continues, the objections enumerated here may be entirely removed in time.

Although most of the discussion was made with respect to the change in procedure for determining the octane number, there was a limited amount of discussion following the many other papers of immediate interest. In most cases, however, the subject was so well covered by the paper itself that little open discussion resulted. S. S. Smith, of the Shell Petroleum Corp., discussed a paper prepared by Dr. G. G. Brown of the University of Michigan, which deals with fundamental research in the design and operation of vapor absorbers, strippers and fractionators. The work covers all normal conditions in refining and natural gasoline plant operation and is particularly valuable in the design of high pressure absorbers and fractionators where the ordinary gas laws have found to yield errors. The first portion of Doctor Brown's work was included in a paper published in The Oil and Gas Journal on page 41 of the May 26 issue and that portion of the work summarized before the A.P.I. meeting of refinery technologists will be published in an early issue of The Oil and Gas Journal.

Price Cutting Is Biggest Tax on Business

Policy Being Pursued by Some Equipment Manufacturers Has Greater Effect Than Any Schedule in Federal Tax Measure

By Andrew M. Rowley

The American people today are discussing taxes more than any other subject. The petroleum industry has been especially hard hit by the revenue bill signed Monday by President Hoover. The taxes on gasoline, lubricating oils, pipe line business, etc., have been considered by the board of directors of the American Petroleum Institute and by every oil company in the business. Executives and individuals alike have considered these taxes and their effect on their particular business.

Price cutting is a greater tax on all business than any schedule included in the revenue bill passed by Congress and signed by the President.

Every time a price cutter gives an additional 10 per cent discount he not only reduces the income of his own company but he makes it just that much harder for all legitimate business to make a reasonable and just profit on operations. And, when price cutting results in the sale of inferior products, the buyer pays a greater tax on the business than he realizes at the time. Inferior quality in oil country products can result in inestimable damage or costly repairs which bring the total cost of the equipment far above the price quoted by established and reliable concerns.

Oil Industry Can Take Lead

The Oil and Gas Journal has contended for a long time the petroleum industry is in the best position to lead all business in the United States back to better business conditions. Oil company executives realize an improvement in general business conditions throughout the country will result in greater business for oil companies and an increased consumption of gasoline and lubricating oils. The changed financial status of oil companies is due to the higher price level recently established and to the realization upon the part of officials products must be sold at a profit. The enormous losses sustained last year were due to the low price level and to the fact gallonage seemed to be the goal of refiners rather than that each sale should represent a profit to the company.

Buyers of oil field and refinery equipment should keep in mind the fact other business concerns should make a profit on their operations also. If these concerns don't make a profit, it won't be long until they are out of business. And these concerns have rendered a great service to the petroleum industry.

Along this line, let me quote from a letter received from the president of a large equipment manufacturing concern. He says: "I am perfectly confident that prosperity must be founded upon profit in operations, and for us to cut operating costs and reduce personnel is merely to add to the aggravation of an already disturbed economic world. Just for instance, we have some 400 men on the pay roll. Nearly all of them drive motor cars. If oil operators force our prices down until there is no profit and we, in turn, cut the pay of our men so we can continue in business, then it stands to reason that these 400 men cannot drive their motor cars; they cannot go on vacations or take trips; therefore, their buying power will be cut down just that much and that is of no profit either to us or the oil industry."

Render a Widespread Service

Another thought worthy of most careful consideration is advanced by the head of one of the largest supply companies in the oil business. He differentiates between the major supply companies and the hundred or more "suppliers". He says: "The majors have not only spent lavishly in research and engineering in an endeavor to develop machinery applicable to every oil country problem, but have also opened stores and shops at scores of points—many of which are losing ventures—in order to give a complete service to the oil operators. They have sent engineers and service men to every oil field in the world and advertised in trade journals, catalogs and bulletins, their specialties and complete lines of equipment, all of which has cost money and served the consumers.

"On the other hand, there is the fly-by-night outfit that jumps into a new field, like East Texas for example, and with a small quantity of the most profitable items, all of which are also available at the stores of the major supply companies in the same area and at fair prices, manages, by hook or crook and with a minimum of overhead and expense and service, to obtain a profitable volume of business for a time. When the unprofitable stage, due to decline in development work, is reached, these parasites disappear. Meanwhile, they have banked some undeserved profits which legitimately belonged to those major supply companies whose service to the industry is extensive, genuine and constant.

"A supply company with from 80 to 100 branches is probably losing money at one-half or more of them, even in normal times. This is due to the fact that branch stores and occasionally shops must be opened in new fields before there is sufficient business to afford a profit, and likewise conducted in old fields in order to serve machinery and equipment already in use, long after the profitable phase has passed."

After-the-Sale Service

The matter of service rendered by many established equipment manufacturers is emphasized by the president of another company. He points out this service is rendered without charge and indicates, in his belief, some purchasing agents are not conversant with this phase of work of the manufacturer, as they have purchased equipment at a reduction in price from concerns who do not give this service. In this connection, he says: "We have approximately 15 men in our organization who are all service engineers. These men have been especially trained. In a year's time we receive hundreds of calls for service. We render this service gratis. We must necessarily figure it as a part of our overhead. Hence, all quotations are based on proper overhead percentages and everybody pays for it. The trouble is the mechanical departments that call for the service do not co-operate at all times with the purchasing agent and probably very seldom makes any mention of the service to their superior officers. Furthermore, we inspect all raw materials at the source before shipment as good raw materials are essential if we expect to continue to ship a good finished article."

There is a community of interest between buyers and sellers of oil field and refinery equipment. This has been muddied somewhat by price-cutting tactics employed by a number of concerns recently but it is believed the waters are clearing. The manufacturers do not blame purchasing agents for buying as cheaply as they can but they do point out that equipment of inferior quality is being sold at these low prices; that many sellers are not long established in the business and cannot render the service given by the other companies; and that quality and past and future service are most important factors which should be considered by purchasing agents in every transaction.

No manufacturer of oil field or refinery equipment should sell any product at a price which does not represent a reasonable profit. If he does he cannot long remain in business. No purchasing agent should expect to buy any equipment at a price at or below the cost of manufacture. He must know the concern doing business in that way cannot give the service which may be needed on that equipment or to make good any defects which may develop. Price cutters should be treated as The Oil and Gas Journal employes served agents trying to sell coupons for cut-price gasoline. We threw them out of our office.

Leaders Express Views on Stabilization

Lawyers, Oil Company Executives and Educators Concur in Need for Educational Program to Aid Oil Industry

By Earl Oliver

In this series of articles, it is the desire to reflect, as nearly as possible, the various attitudes that are found to exist regarding proposed methods of rationalizing the petroleum industry. These comments were received by The Oil and Gas Journal in letters replying to the request of this publication for expressions on the proposed stabilization program described in the issue of April 21. In last week's article, a strong opposition viewpoint was presented. In this article, a more sympathetic attitude is disclosed. Expressions are reproduced from two lawyers, two executives of major companies, two independent oil men largely engaged in royalty activities and two educators in state universities. All these are men of recognized ability, vision and leadership in their respective fields.

In next week's article, we shall attempt to reflect the attitude of men in government who are compelled to view the problems discussed from the viewpoint of the consumer and of the general public welfare. Secretary of the Interior Ray Lyman Wilbur, chairman of the Federal Oil Conservation Board, and Paul A. Walker, chairman of the Oklahoma Corporation Commission, will each be quoted extensively on the issues involved.

Of those quoted in today's article, Mr. German is general attorney for the Skelly Oil Co., a well known independent company, and was chief counsel for the industry in the important Julian and Champlin cases recently decided defining the right of the State to require rationalizing methods in oil field development. Robert E. Hardwicke is in the general practice of law at Fort Worth, Tex., with both majors and independents as clients, and occupies in Texas the same relative position in respect to shaping the legal efforts to rationalize the oil business in that State as has been described for Mr. German in Oklahoma.

Messrs. Kingsbury and Holmes are presidents, respectively, of the Standard Oil Co. of California and The Texas Company, both major companies, while Messrs. Cleary and Umpleby are presidents, respectively, of the Pendulum Investment Co. of Ponca City, Okla., and the Goldeline Oil Co. of Norman, Okla. Both of the latter named gentlemen are decidedly of the independent branch of the oil industry and are largely engaged in royalty activities. Doctor Umpleby is a geologist and engineer. Doctor Stephenson is professor of mining engineering in the School of Mines and Metallurgy, University of Missouri, Rolla, Mo., and Doctor Young occupies the same relative position in the University of Kansas at Lawrence, Kans. The letters mentioned follow:

Letter From Mr. German

"Your letter of April 2 and the proofs of the article by Mr. Oliver and of your editorial have been read with a great deal of interest.

"Mr. Oliver read to me a while back a tentative draft of his article, and I then told him I was in accord with his idea that many agencies in addition to the A.I.M.E. and the A.P.I. and petroleum journals, will have to be enlisted to promote the idea of unit operation before we can hope to attain legislative authorization for its practice. There is too much suspicion of an ulterior motive prompting some oil producers who advocate it, and this is because its merits are not yet fully understood by a great many people.

"W. P. Z. German."

Views of R. E. Hardwicke

"I have received your letter of April 2, together with proof of an article by Mr. Earl Oliver and an editorial under the title, "Remove the Cause." The article and the editorial present in a very interesting and understanding way fundamental problems with excellent methods for solution.

"The court of civil appeals for the third supreme judicial district of Texas, in the Danciger case, has recently upheld orders of the Railroad Commission of Texas based on the old law and applying the market demand theory. Application for writ of error to the Supreme Court of Texas will, of course, be filed by appellant. The decision of the court of civil appeals is not final unless writ of error is refused. The Supreme Court of the United States will shortly render its decision in the Champlin case. If it upholds the decision of the lower court, thereby approving the right of the State to prevent waste, to adjust correlative rights, and, in reaching those ends, to limit production to market demand whenever there is overproduction, then many of our legal complications will have been removed. Assuming that further legislation is necessary to carry out the principles set forth in the two articles mentioned, it is difficult to suggest what that legislation should be until the courts have definitely determined, among other questions, whether restriction of production to so-called "market demand" is a proper method of adjusting correlative rights and preventing waste where overproduction exists.

"It seems to me that, until we know what sort of legislation will stand the tests of the courts, it is difficult to advance, except in very general terms, any program of education such as is suggested by Mr. Oliver. The article by Mr. Oliver, and your editorial, are very beneficial in preparing the way for a very definite plan to put into effect the fundamental principles. When such a plan has been worked out in conformity with decisions of the courts, it doubtless will then be necessary to educate the public sufficiently to get proper legislation. Obviously the public to be educated must be shown just exactly how the operation of any new plan will affect the various classes, for instance: Operators, lessors, gasoline purchasers, etc. Generalities will not suffice.

"Your journal has certainly done its part in trying to solve the many difficult problems confronting the oil industry and Messrs. Oliver and German have done more than their share of carrying on the good work.

"R. E. Hardwicke."

R. C. Holmes in Accord

"I have read carefully the editorial attached to your letter of April 2, and as I have already said to Mr. Oliver, I am in accord with this general theory or principle.

"R. C. Holmes."

Mr. Kingsbury's Views

"On my return, after some weeks' absence, I find your letter of April 2.

"In the face of a prevalent overproduction there

PROGRAM PROPOSED FOR STABILIZATION OF PETROLEUM INDUSTRY

1. That each landowner or his assigns is entitled to an amount of oil and/or gas from the common reservoir equivalent to the extractable oil and/or gas contained in his land, and should be protected in the enjoyment of that right.

2. That the pressure, or force of expulsion, contained in the reservoir is a common attribute of the reservoir and cannot be utilized to its greatest advantage except as it is treated and controlled as a single combined force. It should be conserved to the common interest of the several owners, and its dissipation should not be permitted except as it is efficiently utilized in driving oil and gas from the reservoir rock to the point of extraction. That the pool should be so developed and operated as to effectively utilize this force and promote most complete extraction at a minimum of cost, conserving the forces native to the reservoir to that end, with each owner entitled to his ratable share of oil and gas from the common reservoir according to the standard set out in principle No. 1 and made available to him at a time and in quantities consistent with his needs, in so far as the same can be safely and equitably done within the limit of the known reserves and available facilities and the right to a like degree of enjoyment of them by other owners in the same pool.

3. That during periods of general overproduction, the State in order to prevent waste and/or to protect the respective owners as per principles No. 1 and No. 2 above, should determine from time to time the maximum amount of oil and gas that is to be produced within the State and to that end should limit the production in any pool to not exceed the market demand for oil therein.

4. That an interstate compact in harmony with the proposal of Secretary Wilbur be enacted to promote unity of action and uniform practices among the several oil-producing states, to negotiate for world conservation methods so that floods of foreign oil shall not be thrown into competition with United States domestic production under conditions that are injurious to all parties concerned and to provide federal co-operation in helping to stabilize the oil industry.

5. That the necessary state and federal laws should be enacted or amended to promote and permit general application of the above principles.

6. That a planning committee composed of men selected from all factions of the oil industry and headed by a nationally known figure from outside the industry qualified to lead an industrial reconstruction movement and in whose judgment and loyalty to the public interest the various branches of the industry and the consuming public have confidence, should be set up to formulate and promote ways and means of establishing the principles above defined. Naturally that planning committee should include representative leaders of the various conflicting groups of a type that might draw together into united action all those conflicting factions.

The above principles were worded as follows in the article of April 21, to which the replies were addressed.

10. *What should be the chief characteristics of these changed laws?*

(a) They should be directed toward efficient development and production practices, not only in the public welfare but that no one owner shall by his method injure another owner.

(b) They should substitute for the "capture theory" in oil and gas, regulatory action in development and operation that would have the same practical results as would "ownership in place" strictly applied.

(c) They should protect the small owner against injustice or elimination.

(d) They should protect the consuming public against exploitation in price or waste of product.

(e) They should provide for restricting production to market demand as estimated from time to time by some governmental agency—preferably by an interstate compact organization also authorized to negotiate for foreign restrictions (as per Secretary Wilbur's proposal).

33. *How, then, can this great educational and legislative program be most effectively promoted?*

By creating a central committee or organization that will gradually draw together into a united effort all the organizations named in questions 23 to 29, inclusive, that are willing to promote this movement, or such members of those organizations as favor the movement when the organization itself cannot join in promoting it, because of divided sentiment among its membership. Stabilizing the petroleum industry is of sufficient consequence to justify taking whatever reasonable means will most effectively accomplish that end.

can be no doubt that the doctrine of correlative rights, as it is now being developed, will tend to bring order into the industry.

"Mr. Oliver's premises and conclusions generally seem sound. The thing to guard against, of course, is an undue surrender to government control exercised either legislatively or administratively. I assume we all are hopeful that some day the industry will return to normal conditions under which supply and demand will bear such a relation to each other as will permit the industry to function without resort to extraordinary control.

"K. R. Kingsbury."

Change in Methods Necessary

"Your letter together with a copy of your editorial, "Remove the Cause," at hand.

"It is apparent to every one connected with the oil industry that a change in productive methods must be had before there can be a real recovery in this business. May I suggest that you center your fire to bring about the change on the engineering forces in the industry. Let the intelligence radiate out from the most intelligent to the least intelligent in the production of oil. I believe that if the engineering division of the industry will get solidly and boldly behind this plan, success is certain.

"The Oil and Gas Journal can be the medium of presenting the plan from its various angles with a view of the education of its readers, but I believe the driving force must come from intelligent organization.

"I have the utmost respect for Mr. Earl Oliver, and I have thoroughly enjoyed his articles as presented in your good paper. I trust that momentum may come from the source indicated above that will bring about this great change in the industry.

"John K. Cleary."

Letter From J. B. Umpleby

"I appreciate your letter of April 2 asking my views of the educational program you have been carrying on with reference to control in the oil industry.

"This subject has greatly interested me for several years. Viewed over any period of weeks or even months, progress attained is disappointing, but if we compare the general state of mind prior to Mr. Marland's conference on the function of gas in oil production in 1927, with that now, the progress is amazing.

"I believe Oliver is right in saying it is a matter of education, but as is true of all education, the necessary repetition becomes irksome to the educators. Most of us, after reaching a conclusion want to pass on to something new, hence, a strong tendency for the program to die from inaction. Oliver, German and the Journal have been the best stayers in the field and deserve congratulations. The desired changes are coming gradually, through legal decisions, but such progress is too slow. The industry is largely convinced—popular support is required. The more agencies co-operating the better.

"J. B. Umpleby."

Need Modification of Laws

"Thank you for the proof of article by Earl Oliver together with your editorial comments. I am entirely in sympathy with the ideas presented in both articles.

"For a long time engineers have recognized the waste which accompanied the usual stampede for oil at the flush stage of pool development, and the unfairness of any law which permitted an individual to waste the energy which expels the oil from the sands, in order that he might obtain more oil than originally was present under his particular tract of land. The laws which today govern our production practices were framed long before the principles of oil and gas occurrence, migration and production were understood, and it is indeed unfortunate that the task of modifying these laws is so difficult of accomplishment.

"We are now facing a period of overproduction, one which has continued for some ten years and the various artificial devices or procedures for limiting the excess production have been more or less experiments or measures of expediency. A sound legal basis for regulating oil and gas production will be as valuable in times of a shortage in oil as in times of a surplus and every possible endeavor should be made, both through the channels which Mr. Oliver mentions and through extensive advertising to present this matter before the public. You are to be commended for the stand you have taken.

"Eugene A. Stephenson."

"I have read with interest your letter of April 2, together with the accompanying proofs of Mr. Oliver's article and the editorial.

"My first reaction, and one which will probably remain unchanged, is to say, "educate by all means." Probably people immediately connected with the oil industry have no conception of the complete lack of knowledge regarding it on the part of the general public. Most people know nothing of the industry beyond the immediate price of gasoline, rumors of fortunes made and lost, and a general feeling that they are being exploited by large companies. The proofs which you sent recognize the prejudice arising from this condition. More complete information might remove some of the resistance to change which is founded on suspicion.

"Then, too, a wider interest may lead to proposals of value. Without any desire to criticize Mr. Oliver as far as he has gone, I cannot help feeling that there are fundamentals which his program does not reach. Apparently any satisfactory revision of the legal status of property in oil and gas will require a considerable upset in our attitude toward mineral properties in general. I do not pretend to know what this readjustment will be, but I have some hope that a widespread interest may lead to a solution which will be at least part way satisfactory and that the greater the popular knowledge and interest, the better the chance will be for the oil and gas industry and for the people as a whole.

"I find that I could go on and expand this letter into a considerable discussion, but it would be of no present value.

"I am glad to see any discussion in The Oil and Gas Journal which will influence opinion and serve as a stimulus to improvement of conditions and Mr. Oliver's article and your editorial promise to do this. I regard them as steps rather than as ends. Before any change in public attitude can be brought about, there must be a period of education which will reach people who are almost entirely ignorant of conditions, which is a very difficult thing to accomplish. However, the greater the interest among those connected with the industry, the greater the opportunity for that interest to spread and the proposed educational campaign ought to be a good start.

"C. M. Young."

Install Large Gasoline Recovery Unit

New Plant at Standard of New Jersey Refinery Has Capacity of 45,000 Gallons Daily

NEW YORK, June 6.—Standard Oil Co. (New Jersey) has placed in operation at its Bayway, N. J., refinery a new gasoline recovery and stabilizing plant. The new unit, which operates with gases from the refinery's cracking equipment, has a daily capacity for 45,000 gallons.

Construction of the new unit emphasizes the attention to cracking given by major refining companies in keeping with the changing gasoline requirements of the motoring public. In 1920, only 16 per cent of the total gasoline sold in the United States was produced by cracking installations. At present, at the Bayway works of the Standard Oil Co. (New Jersey), approximately 65 per cent of all "Standard" motor gasoline is now produced by cracking. Up to a few years ago, oils were cracking at about 100 pounds pressure and at a temperature of 750° F. The cracking coils of today are operating at 750 and 1,000 pounds pressure and at temperatures ranging from 900° to nearly 1,000° F. While these improvements in the technique of cracking have constantly increased gasoline quality, they have at the same time resulted in a larger production of gas, as the gasoline produced from these cracking operations is condensed in the presence of large volumes of gas.

The new Bayway unit was designed by the company's engineering department to recover the available gasoline from this large amount of cracking coil gas, in addition to the small volume of gas from other sources about the refinery.

Method of Operation

In the operation of the new unit, gases from the crude and rerun stills are collected by motor-driven compressors, automatically controlled to insure the maintenance of a constant vacuum and to discharge the gas at a uniform pressure of about 75 pounds. The gas next passes through an absorber, shown in the left of the group of three towers in the background of the accompanying illustration. The larger volume of cracking coil gas

(Continued on Page 47)

View of gasoline recovery plant at Bayway, N. J., refinery of Standard Oil Co. of New Jersey.

June Refinery Runs Held to Demand

Mid-Continent Schedule Only Slightly Higher Than a Month Ago and 127,000 Bbls. Below a Year Ago

By W. T. Ziegenhain

Mid-Continent refiners are maintaining crude runs during June at about the same level as May. This month's crude runs will approximate 441,000 bbls. daily compared with 436,000 bbls. a month ago. The present low schedule of runs reflects the determined efforts of refiners to hold their operations within demands and they are not willing to gamble with the future in building up stocks in anticipation of a large seasonal increase in demands through July, August and September. Because there has been a new movement on foot to curtail refinery runs the fact the June schedule was slightly higher than that of May might prove disappointing in the interests of improving refinery market prices but when comparing the runs of this June with those of previous years a much more optimistic condition may be seen.

Just a year ago, the same group of refiners were running 568,000 bbls. daily or 127,000 bbls. more than at present. Two years ago they were running 132,000 bbls. more and three years ago, the all-time peak, they were running 583,000 bbls., or 143,000 bbls. more crude daily.

It has always been the practice of the Mid-Continent refiners to greatly increase their runs over the first six months to a maximum in June, July or August. Last year this increase from the first of the year to June 1 was 90,000 bbls., while this year the increase has been only 35,000 bbls.

The total crude runs of the individual districts shows little change, and there have been but few changes in the status of the individual plants. One small plant has been shut down and one has been started up, and with these exceptions, the operations of all plants have been practically unchanged.

Tax Legislation

With the passage of a 1-cent per gallon gasoline tax and a 4-cent lubricating oil tax this week by the Federal Government effective June 21 refiners anticipate a marked increase in shipments in the meantime. Jobbers and refiners interpret the tax as applicable only on gasoline and lub oils leaving the refinery after that date and jobbers and retailers who have storage may order out material now for storage and escape the levy. What effect this temporary flurry in business will have upon crude runs cannot be anticipated, for there is enough of these products now in storage to meet any reasonable increase in demands. A factor which will exert a balancing effect is that most jobbers do not have large storage capacity and cannot buy in large quantities now. Also, many marketers have limited credit, and sales are being made on a stricter credit basis.

After June 21 there will probably come a lull in the spot market while jobbers use up the gasoline and oil stored in anticipation of the tax, and over the month the matter of crude runs will equalize itself.

Oklahoma

Oklahoma refiners will run practically the same volume of crude in June as they did in May. This is also true of the individual plants. An effort is being made to revise the schedules to a lower figure, due to the large drop in demand most of the companies are witnessing, but so far these companies have simply held to last month's schedule and neither increased or decreased.

Because of a very heavy rain at Oklahoma City a week ago which flooded a large portion of the section in which most of the refineries are located, plant operations were generally suspended for about four days. For a period of six hours every plant was down as a safety measure, but the Black Gold Refining Co. resumed operations immediately and within the four days following the Capital City Refining Co. and York Refining Co. resumed operations. The Sterling Refining Co. will resume within a few days. The shutdown will not alter the schedule of runs over the month.

Kansas

Kansas refiners will show a reduction of about 2,000 bbls. in the combined daily average runs. The Altitude Petroleum Corp. is not running crude at its plant at Chanute but is running approximately 1,000 bbls. of charging stock to the pressure stills daily. There are no other changes in the status of the operating and shutdown refineries.

West Texas

The West Texas plants will also run approximately the same volume of crude in June as in May. June runs have been scheduled at 31,410 bbls. daily. One new plant has been added to the list, namely the Phoenix Refining Co. at Pettus. This is an 800-bbl. plant and is running approximately 600 bbls. daily of local crude. Balancing the effect of this plant is the shutting down of the Tonkawa Petroleum Co. plant at Pyote.

Although the Howard County Refining Co.'s plant is shown as shut down for May and June, it ran 19,000 bbls. in May, the plant shutting down on May 20.

East Texas

A slight increase is shown in the runs at East Texas plants as a group, the increase being accounted for entirely by the resumption of operations in the Arrow Refining Co. The proration of crude production has limited the refinery runs in several cases but refiners in the East Texas area have felt the slow demand for gasoline just as the refiners in other areas have felt this and there has been no general desire to increase runs and hazard the refined oil market.

Although the Constantin Refining Co. has its plant at Overton shut down and has not operated for a considerable time, improvements are being made for the purpose of starting it up. A small pressure unit is being added to the plant.

North Central Texas

The North Central Texas group of refiners is the only one to show any material change in total crude runs. Here the schedule has been estimated for June at 97,455 bbls. daily or about 4,000 bbls. more than during May. This increase was the result of raising the runs a small percentage in quite a number of plants and was not accounted for in any single plant. The status of the operating and shut down plants remained unchanged.

The Wilcox Oil & Gas Co. has not made a decision in rebuilding its Pampa plant but has been asking for bids on equipment. The Petroleum Refractionating Co. is considering adding a cracking unit at its Pampa plant.

North Louisiana and Arkansas

The North Louisiana runs and the Arkansas runs for June will each show approximately the same schedule. There has been no change in the status of the operating and shut down plants.

MID-CONTINENT REFINERY OPERATIONS

CRUDE RUNS TO STILLS

	1929	1930	1931	1932
January 1	508,550	535,460	478,795	405,910
February 1	506,800	519,355	470,125	411,280
March 1	514,950	531,500	449,634	401,155
April 1	530,530	555,250	497,391	419,750
May 1	577,500	574,300	510,640	436,160
June 1	583,030	572,250	567,915	440,765
July 1	565,800	548,475	588,840	.....
August 1	555,250	526,400	590,545	.....
September 1	552,300	498,710	588,105	.....
October 1	544,720	518,800	472,190	.....
November 1	545,473	506,700	480,440	.....
December 1	540,630	478,360	456,525	.....

OPERATIONS BY DISTRICTS

District—	June 1 Dly. crude capacity (bbls.)	June 1 Dly. crude runs (bbls.)	May 1 Dly. crude runs (bbls.)	June 1 Dly. increase (bbls.)
Arkansas	48,000	22,500	20,300	2,200
Kansas	153,500	87,600	89,500	*1,900
North Louisiana	40,250	26,900	27,500	*600
Oklahoma	309,300	159,600	159,100	500
North Central Texas	204,000	97,455	93,850	3,605
West Texas	139,900	31,410	31,360	50
East Texas	79,800	15,300	14,550	750
Total	975,450	440,765	436,160	4,605

*Decrease.

REFINERY OPERATIONS IN WEST TEXAS

(Plants which have been in operation during the past year)

Company and location—	Daily capacity	Runs June 1	Runs May 1
Bluebonnett Oil Refining Co., Wickett	5,000	(*)	(*)
Bobrose Oil & Refineries, Luling	2,500	600	(*)
Burford Oil Co., Pecos City	6,000	(*)	(*)
Coltex Refining Co., Colorado	10,000	3,500	2,000
Concho Refining Co., San Angelo	200	50	50
Cosden Oil Co., Big Spring	15,000	5,000	5,200
Grayburg Oil Co., San Antonio	6,000	1,000	(*)
Great West Refining Co., Big Spring	3,500	(*)	(*)
Gulf Refining Co., Sweetwater	5,000	4,000	4,000
Howard County Refining Co.	2,500	(*)	(*)
Humble Oil & Refining Co., San Antonio	5,000	1,450	1,950
Humble Oil & Refining Co., McCamey	15,000	(*)	(*)
Magnolia Petroleum Co., Luling	5,000	2,000	3,300
Marathon Oil Co., Del Rio	5,000	1,500	1,500
Mirko Refineries, Inc., Laredo	1,500	550	900
Motor Fuel Products Co., Laredo	2,000	(*)	(*)
Paramount Refining Co., San Angelo	2,000	600	600
Pazotex Petroleum Co., El Paso	14,000	2,500	4,300
Phoenix Refining Co., Pettus	800	600	(*)
Pioneer Oil & Refining Co., Somerset	1,500	1,000	1,000
Richardson Refining Co., Big Spring	6,000	(*)	(*)
Rio Grande Oil Co., El Paso	6,000	1,000	1,000
Signal Gasoline Co., Texon	500	(*)	(*)
The Texas Company, San Antonio	3,000	2,500	2,500
The Texas Company, El Paso	2,000	500	500
Tonkawa Petroleum Co., Pyote	5,000	(*)	1,500
Texas Mexican Oil & Refining Co., Laredo	600	400	400
Texas Petroleum Products Co., Somerset	1,500	600	600
Wickett Refining Co., Wickett	2,500	560	60
Total	133,200	31,410	31,360

*Shut down.

REFINERY OPERATIONS IN NORTH LOUISIANA

(Plants which have been in operation during the past year)

Company and location—	Daily capacity	Runs June 1	Runs May 1
Bayou State Refining Co., Hosston	750	(*)	(*)
Louisiana Oil Refining Co., Shreveport, Bossier	19,000	18,400	18,000
Spartan Refining Co., Shreveport	10,000	6,000	6,500
Stanolind Oil & Gas Co., Superior	3,500	2,500	3,000
The Texas Company, Shreveport	7,000	(*)	(*)
Total	40,250	26,900	27,500

*Shut down.

REFINERY OPERATIONS IN KANSAS

(Plants which have been in operation during the past year)

Company and location—	Daily capacity	Runs June 1	Runs May 1
Altitude Petroleum Corp., Chanute	5,000	(†)	1,000
Barnsdall Refineries, Inc., Wichita	4,000	4,000	3,200
Derby Oil Co., Wichita	7,500	4,000	4,000
Eldorado Refining Co., Eldorado	4,500	3,000	3,000
Golden Rule Refining Co., Wichita	1,500	900	1,000
Kanotex Refining Co., Arkansas City	12,000	6,500	6,000
National Refining Co., Coffeyville	6,500	5,000	5,000
Phillips Petroleum Co., Kansas City	7,500	6,500	7,500
Shell Petroleum Corp., Arkansas City	22,000	13,000	14,000
Sinclair Refining Co., Coffeyville	12,000	11,000	10,000
Sinclair Refining Co., Argentine	9,500	(*)	(*)
Skelly Oil Co., Eldorado	23,000	12,200	13,300
Standard Oil Co. of Kansas, Neodesha	20,000	6,000	6,000
Vickers Petroleum Co., Potwin	3,500	2,500	2,000
White Eagle Oil Corp., Augusta	15,000	13,000	13,000
Total	153,500	87,600	89,500

*Shut down. †Cracking 1,000 bbls. daily.

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We can't stop the race for octane number Why try? It's progress

Better anti-knock gasoline means better automobiles, more fun driving, more gasoline burned, more business

Dubbs refiners can make good anti-knock gasoline at low cost They can give the motorist what he wants—and more

Why not do it?

Isn't that the way back to prosperity?

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

A. P. I. Estimate on Gasoline Demand

Domestic Requirements 6 Per Cent Less, Exports From 12 to 14 Per Cent Lower Than Last Year. Withdrawals From Stock Needed

The American Petroleum Institute committee on refinery statistics met in Tulsa on May 31 and studied the report of the voluntary committee on petroleum economics of the Federal Oil Conservation Board, which had been submitted to the Hon. Ray Lyman Wilbur, Secretary of the Interior, on May 23. The committee also studied the findings of its statistical subcommittee which had prepared a forecast of demand, required supply and economic stocks of motor fuel, gas and fuel oils and crude oil, for the period from April 1, 1932, to December 31, 1932.

These reports, each the results of weeks of concentrated study and consideration by competent statisticians and economists, are in substantial agreement. Both have been predicated upon the fundamental principles of the liquidation of surplus inventories to a working stock basis by September 30, 1932, and an establishment of a balance between supply and demand.

Due to the uncertainty prevailing at the time these reports were prepared as to whether or not the importation of crude and its products would be taxed, both committees based their calculations upon a continuation of free importation.

Motor Fuel Demand

The domestic demand for motor fuel is indicated by the Federal Oil Conservation Board's committee at 5.4 per cent less, and by the American Petroleum Institute's committee at 6 per cent less than for the comparable period of the previous year, which contrasts with an increase of approximately 2.5 per cent enjoyed during the corresponding period of 1931. This is the first time that any of these reports have contemplated a decrease in domestic demand.

While the two reports indicate a drop in domestic demand of about 6 per cent for the entire country, a fact which should not be overlooked is that in certain areas, particularly the Middle Western states, the motor fuel demand loss probably will exceed this average. Present information indicates that the loss in that area will be approximately 10 per cent.

It also appreciates the extreme difficulty of forecasting in such chaotic times as at present, and recommends that especial attention be given to future revisions as they become available, for it is altogether possible that forces not now completely measurable may affect the consumption even more adversely than the present report indicates.

The exports of motor fuel are forecast to be from 12 to 14 per cent lower than in the last nine months of 1931. This large decrease is based not only upon an anticipated decline in consumption in foreign countries but also upon changing sources of supply.

The total demand for motor fuel, which is a combination of domestic and export demand, is shown on both reports as declining somewhat less than 7 per cent.

Motor Fuel Stocks

On April 1, 1932, the total stocks of motor fuel were 66,950,000 bbls., which is not comparable with the 43,000,000 bbls. of refinery gasoline stocks recommended for that date in the report submitted in Chicago November, 1931. This 43,000,000 bbls. did not include pipe line, terminal and transit stocks, nor stocks of natural gasoline, etc., which are now being reported currently. The total stocks April 1, 1932, show an increase of 1,829,000 bbls. since the same date in 1931, and are approximately 10 per cent in excess of what they should be for this period of the year. In order to liquidate this surplus and arrive at working stocks September 30, 1932, the reports of both committees indicate a necessary reduction of about 22,000,000 bbls. in inventories, of which some 15,300,000 bbls. represents the normal seasonal withdrawal and 6,700,000 bbls. elimination of excess stocks.

In an effort to prevent having excessive stocks April 1, 1933, both committees show that additions to storage during the last quarter of this year should be considerably restricted.

The two committees had to recognize a tendency of increased imports during the first three months of 1932, which they felt would continue during the early part of the period covered by their forecasts. They felt, however, that the imports during the entire period should be somewhat less than was actually imported during the 1931 period, and therefore indicated a materially decreased rate of imports during the last six months of 1932 in order to affect this reduction.

The two reports contemplating a decline of somewhat less than 7 per cent in total demand and taking as a basis the liquidation of inventories to working stocks arrive at substantially the same conclusion as to the requirements of motor fuel production; namely, that it

TABLE 1—FORECAST OF DEMAND, REQUIRED SUPPLY AND ECONOMIC STOCKS MOTOR FUEL, GAS AND FUEL OILS AND CRUDE OILS
Last Nine Months of 1932 (forecast) vs. Last Nine Months 1931 (actual)
(Barrels of 42 gallons)

	Forecast last 9 months, 1932 (Bbls.)	Actual last 9 months, 1931 (Bbls.)	Increase or dec'se Bbls.	Increase or dec'se %
MOTOR FUEL:				
Demand:				
Domestic	305,500,000	326,097,000	—19,597,000	— 6.0
Export	30,000,000	34,292,000	— 4,292,000	—12.5
Total demand	335,500,000	359,389,000	—23,889,000	— 6.6
Supply:				
Production—Straightrun	156,385,000	171,343,000	—20,458,000	—11.9
Production—Cracked	128,550,000	136,844,000	— 8,294,000	— 6.1
Production—Natural	25,850,000	31,147,000	— 5,297,000	—17.0
Production—Benzol	1,100,000	1,379,000	— 279,000	—20.2
Total production	306,385,000	340,713,000	—34,328,000	—10.1
Imports	9,600,000	9,726,000	— 126,000	— 1.3
Total new supply	315,985,000	350,439,000	—34,454,000	— 9.8
To or from stocks	—19,515,000	—8,950,000		
Stocks:				
April 1	66,950,000	65,121,000		
June 30	59,655,000	60,165,000		
September 30	45,280,000	50,122,000		
December 31	47,435,000	56,171,000		
Withdrawal Apr. 1 to Sept. 30	21,670,000	14,999,000		
Addition Sept. 30 to Dec. 31	2,155,000	6,049,000		
GAS AND FUEL OILS:				
Demand:				
Domestic	234,000,000	246,259,000	—12,259,000	— 5.0
Export	13,900,000	21,429,000	— 7,529,000	—35.1
Total demand	247,900,000	267,688,000	—19,788,000	— 7.4
Supply:				
Refinery production	225,500,000	255,220,000	—29,720,000	—11.6
Imports	17,000,000	17,554,000	— 554,000	— 3.2
Trans. from crude (Cal.)	4,500,000	2,030,000	+ 2,470,000	—121.7
Total new supply	247,000,000	274,804,000	—27,804,000	—10.1
To or from stocks	—900,000	—7,116,000		
Stocks:				
April 1	126,251,000	128,740,000		
September 30	129,555,000	129,295,000		
December 31	125,351,000	135,856,000		
Addition Apr. 1 to Sept. 30	3,304,000	10,555,000		
Withdrawal Sept. 30 to Dec. 31	4,204,000	3,439,000		
CRUDE OIL:				
Demand:				
Runs to stills	615,381,000	685,416,000	—69,555,000	—10.1
Export	20,000,000	20,331,000	— 331,000	— 1.6
Transfer to fuel (Cal.)	4,500,000	2,030,000	+ 2,470,000	—121.7
Used as such	10,000,000	11,411,000	— 1,411,000	—12.4
Total demand	650,381,000	718,208,000	—68,827,000	— 9.6
Supply:				
U. S. production	618,381,000	654,500,000	—66,459,000	— 9.7
Stock withdrawn		30,340,000		
Imports	32,000,000	34,368,000	— 2,368,000	— 6.9
Total supply	650,381,000	719,208,000	—68,827,000	— 9.6
Stocks:				
April 1	371,854,000	401,570,000		
December 31	.....	371,230,000		
Withdrawal Apr. 1 to Dec. 31		30,340,000		

DOMESTIC CRUDE REQUIRED APRIL-DECEMBER, 1932
(To be supplied from production and stocks)

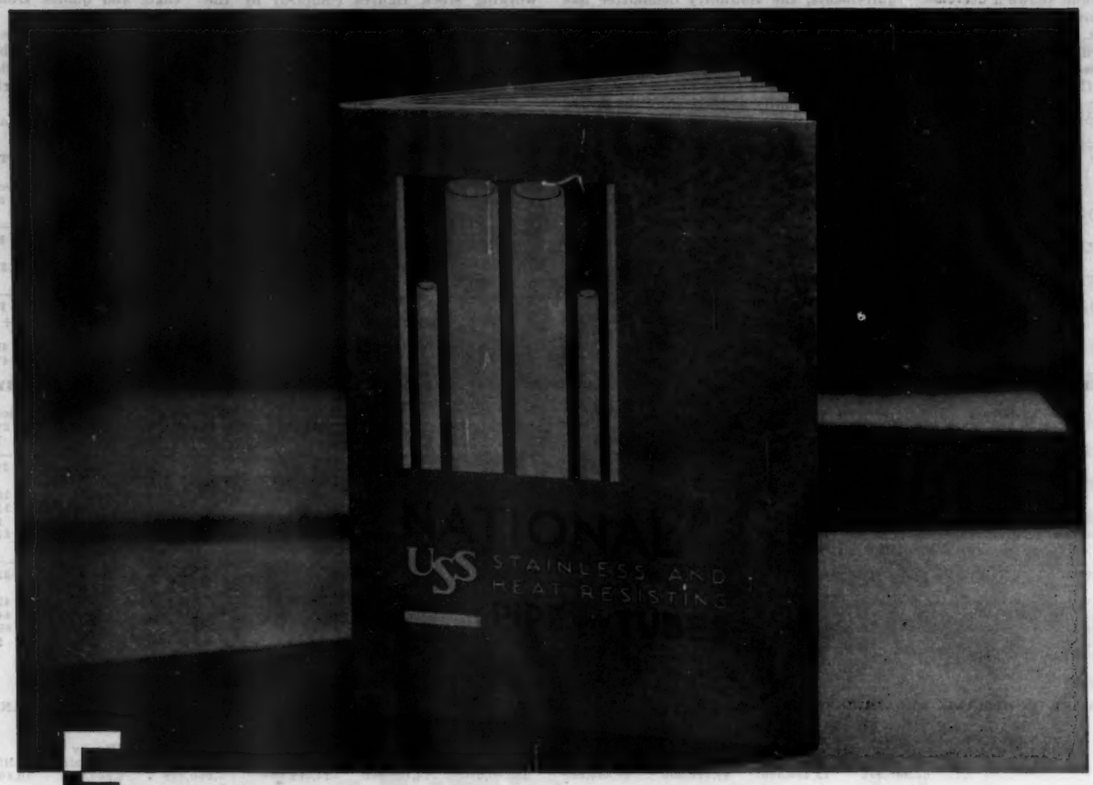
Month—	Ttl. bbls.	Average per day	Month—	Ttl. bbls.	Average per day
Apr.	61,007,000	2,033,600	Oct.	72,578,000	2,350,900
May	66,341,000	2,140,000	Nov.	68,266,000	2,275,500
June	65,948,000	2,198,300	Dec.	66,415,000	2,142,400
Quarter	193,296,000	2,134,100	Quarter	207,499,000	2,255,400
July	72,928,000	2,352,500			
Aug.	73,861,000	2,382,600	Nine-month period	618,381,000	2,248,700
Sept.	76,797,000	2,559,900			
Quarter	217,586,000	2,365,100			

TABLE 2—FORECAST OF DEMAND, REQUIRED SUPPLY AND ECONOMIC STOCKS OF MOTOR FUEL LAST NINE MONTHS OF 1932 (Forecast) vs. LAST NINE MONTHS OF 1931 (Actual)
(Barrels of 42 gallons)

	Refinery gasoline (Straightrun, cracked and natural blended)				Benzol and other natural gasoline				Total motor fuel			
	Forecast last 9 months, 1932	Actual last 9 months, 1931	Increase-dec.	%	Forecast last 9 mos. 1932	Actual last 9 mos. 1932	Inc.-dec.	%	Forecast last 9 mos. 1932	Actual last 9 mos. 1931	Inc.-dec.	%
Demand:												
Domestic	299,500,000	319,576,000	—20,076,000	— 6.3	6,000,000	6,521,000	+479,000	+ 8.7	305,500,000	326,097,000	—19,597,000	— 6.0
Export	28,400,000	32,108,000	— 3,708,000	—11.5	1,600,000	2,184,000	+584,000	—26.7	30,000,000	34,292,000	— 4,292,000	—12.5
Total demand	327,900,000	351,684,000	—23,784,000	— 6.8	7,600,000	7,705,000	—105,000	— 1.4	335,500,000	359,389,000	—23,889,000	— 6.6
Supply:												
Production	299,735,000	333,892,000	—34,103,000	—10.2	6,600,000	6,820,000	—220,000	— 3.2	306,385,000	340,713,000	—34,328,000	—10.1
Imports	9,600,000	9,726,000	— 126,000	— 1.3	.....	.....	.....	...	9,600,000	9,726,000	— 126,000	— 1.3
Total new supply	309,335,000	343,619,000	—34,284,000	—10.0	6,600,000	6,820,000	—220,000	— 3.2	315,985,000	350,439,000	—34,454,000	— 9.8
To or from stocks	—18,515,000	—8,065,000			—1,000,000	—885,000			—19,515,000	—8,950,000		
Stocks:												
April 1	52,315,000	61,411,000			4,635,000	3,710,000			66,950,000	65,121,000		
June 30	56,510,000	56,137,000			3,145,000	4,028,000			59,655,000	60,165,000		
September 30	42,085,000	47,025,000			3,195,000	3,097,000			45,280,000	50,122,000		
December 31	44,400,000	53,346,000			3,035,000	2,825,000			47,435,000	56,171,000		
Change in stocks:												
April 1 to June 30	—6,405,000	—5,274,000			—890,000	+318,000			—7,295,000	— 4,956,000		
June 30 to September 30	—14,425,000	—9,112,000			+ 50,000	—931,000			—14,375,000	—10,043,000		
September 30 to December 31	+2,315,000	+6,321,000			—160,000	—272,000			+ 2,155,000	+ 6,049,000		

TABLE 3—CLASSIFICATION OF STOCKS OF REFINERY AND MOTOR FUEL

	At refineries		At bulk terminals and in transit		In pipe lines and working tanks		Total refinery gasoline		Natural gasoline (incl. blended)		Total motor fuel stocks	
Stocks:	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931
April 1	47,220,000	47,287,000	14,410,000	13,824,000	1,285,000	400,000	62,915,000	61,411,000	4,035,000	3,710,000	66,950,000	65,121,000
June 30	29,600,000	41,198,000	15,550,000	14,139,000	1,360,000	800,000	56,510,000	56,137,000	3,145,000	4,028,000	59,655,000	60,165,000
September 30	25,400,000	32,294,000	14,250,000	13,831,000	1,435,000	900,000	42,085,000	47,025,000	3,195,000	3,097,000	45,280,000	50,122,000
December 31	28,400,000	38,620,000	14,500,000	13,764,000	1,500,000	962,000	44,400,000	53,346,000	3,035,000	2,825,000	47,435,000	56,171,000
Change in stocks:												
April 1 to June 30	— 7,620,000	—6,189,000	+1,140,000	+315,000	+75,000	+400,000	+ 6,405,000	—5,274,000	—890,000	+318,000	— 7,295,000	— 4,956,000
June 30 to September 30	—14,200,000	—8,904,000	— 300,000	—308,000	+75,000	+100,000	—14,425,000	—9,112,000	+ 50,000	—931,000	—14,375,000	—10,043,000
September 30 to December 31	+ 3,000,000	+6,326,000	— 750,000	— 67,000	+65,000	+ 62,000	+ 2,315,000	+6,321,000	—160,000	—272,000	+ 2,155,000	+ 6,049,000



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should be approximately 10 per cent below the amount produced during the corresponding period of the previous year.

Gas and Fuel Oils

Details covering gas and fuel oils are available only on the American Petroleum Institute committee's report. Its forecast of total demand shows a decrease of 7.4 per cent. However, refinery production is shown at 11.6 per cent less, due to the reduced runs of crude to stills and to a slightly lower yield. Stocks of gas and fuel oils at the end of December, 1932, are indicated at 10,505,000 bbls. less than at the end of 1931, approximately half of the reduction being east of California and half in California.

Crude Oil

The two reports are relatively close in their estimates of the total amount of crude required to be run to stills as well as in the total domestic crude required for the period. Of the total domestic requirements, the voluntary committee has indicated that 7,000,000 bbls. should be supplied by stock withdrawals. Our statistical subcommittee did not indicate how much should come from stocks, nor how much should come from production. Expressed as a daily average over the entire period, the domestic crude requirements, which are to be supplied from production and stock withdrawals combined approximate 2,250,000 bbls. per day, as compared with a daily production of 2,225,000 bbls. for the week ended May 21, 1932.

Conclusion

The required motor fuel supply and stock withdrawals are based upon revised working stock figures compiled by the American Petroleum Institute. The production of motor fuel is the amount the committee thinks is economic and it does not, in any way, indicate what it feels refiners may produce.

In all the tables this same basic idea has been carried out, showing in each instance what the committee felt the industry should strive to accomplish in order to keep a proper balance between supply and demand.

Furthermore, the committee reiterates the conclusions stated in the report submitted at the St. Louis meeting in April, 1931, and again last November in Chicago, and quotes from those reports as follows:

"Throughout the recent experience of the industry it has become increasingly evident that the levels of stocks constitute the best single criterion of economic operation.

(Continued on Page 45)

TABLE 4—FORECAST OF DEMAND, REQUIRED SUPPLY AND ECONOMIC STOCKS OF MOTOR FUEL—LAST NINE MONTHS OF 1932 BY MONTHS
(In thousands of barrels)

	April	May	June	July	August	September	October	November	December	Ttl. 9 mos.
Demand:										
Domestic	30,950	34,400	35,550	38,000	38,600	36,550	33,400	30,050	29,000	305,500
Export	3,300	3,500	3,500	3,500	3,500	3,500	3,100	2,800	2,800	30,000
Total demand	34,250	37,900	39,050	41,500	42,100	39,050	36,700	32,850	31,800	335,500
Supply:										
Production	32,115	33,750	33,050	35,305	35,520	34,750	35,500	33,325	32,750	306,385
Imports	1,500	2,000	1,500	800	800	800	800	600	600	9,600
Total new supply	33,615	35,750	34,550	36,105	36,320	35,550	36,300	33,125	33,350	315,985
To or from stocks	—635	—3,120	—4,540	—5,395	—5,480	—3,500	—400	+275	+1,550	—19,515
Stocks*:										
First of month	66,950	66,315	64,195	59,655	54,260	48,780	45,280	44,880	45,155	.....
End of month	66,315	64,195	59,655	54,260	48,780	45,280	44,880	45,155	47,435	.....

TABLE 5—FORECAST OF DEMAND, REQUIRED SUPPLY AND ECONOMIC STOCKS OF REFINERY GASOLINE ONLY—LAST NINE MONTHS OF 1932 BY MONTHS
(In thousands of barrels)

	April	May	June	July	August	September	October	November	December	Ttl. 9 mos.
Demand:										
Domestic	30,260	33,710	34,765	37,210	37,910	34,960	32,810	29,460	28,415	299,500
Exports	3,140	3,330	3,330	3,300	3,295	3,305	3,130	2,940	2,630	28,400
Total demand	33,400	37,040	38,095	40,510	41,205	38,265	35,940	32,400	31,045	327,900
Supply:										
Straightrun	15,795	16,615	16,420	17,610	17,455	16,990	17,465	16,325	16,010	150,885
Cracked	13,250	14,150	13,650	14,650	15,100	14,850	15,000	14,050	13,750	128,550
Natural blended	2,300	2,500	2,350	2,100	2,050	2,150	2,500	2,200	2,100	20,350
Total refinery production	31,445	33,265	32,420	34,360	34,605	33,990	34,965	32,575	31,860	299,785
Imports	1,500	2,000	1,500	800	800	800	800	600	600	9,600
Total new supply	32,945	35,265	33,920	35,160	35,605	34,790	35,765	33,175	32,460	309,385
Stocks*:										
First of month	62,915	62,460	60,685	56,510	51,160	45,560	42,085	41,910	42,985	.....
End of month	62,460	60,685	56,510	51,160	45,560	42,085	41,910	42,985	44,400	.....
Required crude to stills	64,207	67,841	66,748	71,878	72,061	69,247	71,578	66,906	65,615	615,881
Required crude per day	2,140	2,179	2,225	2,319	2,325	2,312	2,309	2,230	2,117	2,240
Probable straightrun yield	24.6	24.6	24.6	24.5	24.5	24.5	24.4	24.4	24.4	24.5

*See Table 3 for details.

TABLE 6—FORECAST OF DEMAND, REQUIRED SUPPLY AND ECONOMIC STOCKS OF REFINERY GASOLINE; REQUIRED CRUDE RUNS TO STILLS AND PROBABLE YIELDS BY DISTRICTS—LAST NINE MONTHS OF 1932
(Barrels of 42 gallons)

	East Coast	Appalachian	Indiana, Illinois	Oklahoma, Kansas	Inland Texas	Texas Gulf	Louisiana Gulf	N. Louisiana-Arkansas	Rocky Mountain	California	Total all districts
Demand:											
Domestic and export	61,400,000	12,300,000	49,300,000	44,600,000	22,300,000	54,700,000	14,500,000	7,000,000	8,000,000	50,300,000	327,900,000
Supply:											
From straightrun	23,087,650	6,118,000	21,952,000	23,069,000	12,024,000	24,050,000	6,650,000	3,554,000	3,191,000	27,150,000	150,885,000
From cracked	27,102,000	5,879,000	23,705,000	16,031,000	6,474,000	25,367,000	6,331,000	2,681,000	3,190,000	11,800,000	128,550,000
From natural blended	700,000	300,000	1,850,000	3,800,000	2,525,000	2,850,000	760,000	700,000	730,000	6,085,000	20,350,000
Total refinery output	50,889,650	12,297,000	47,547,000	42,900,000	21,023,000	52,267,000	13,741,000	6,935,000	7,161,000	45,035,000	299,785,000
From imports	9,400,000	.....	.....	.....	.....	.....	200,000	.....	.....	.....	9,600,000
Total supply	60,289,000	12,297,000	47,547,000	42,900,000	21,023,000	52,267,000	13,941,000	6,935,000	7,161,000	45,035,000	309,385,000
To or from stocks	—3,111,000	—1,903,000	—1,753,000	—1,700,000	—1,277,000	—2,443,000	—559,000	—65,000	—329,000	—5,765,000	—18,515,000
Stocks (details in Table 3):											
April 1	17,876,000	2,473,000	8,253,000	5,595,000	2,452,000	6,848,000	2,314,000	430,000	2,089,000	14,485,000	62,915,000
April 30	18,010,000	2,400,000	8,330,000	5,530,000	2,370,000	6,750,000	2,210,000	415,000	2,000,000	14,375,000	62,460,000
May 31	18,035,000	2,370,000	8,030,000	5,395,000	2,265,000	6,585,000	2,205,000	400,000	1,950,000	13,450,000	60,685,000
June 30	17,825,000	2,050,000	7,775,000	5,080,000	1,915,000	5,540,000	2,000,000	395,000	1,900,000	12,000,000	56,510,000
July 31	16,740,000	1,805,000	7,250,000	4,825,000	1,510,000	4,975,000	1,645,000	370,000	1,705,000	10,725,000	51,160,000
August 31	15,875,000	1,455,000	6,465,000	3,795,000	1,245,000	4,130,000	1,530,000	345,000	1,400,000	9,300,000	45,560,000
September 30	15,405,000	1,395,000	6,150,000	3,300,000	985,000	3,600,000	1,450,000	330,000	1,210,000	8,250,000	42,085,000
October 31	14,745,000	1,400,000	6,310,000	3,405,000	1,005,000	3,670,000	1,490,000	340,000	1,220,000	8,325,000	41,910,000
November 30	14,405,000	1,520,000	6,455,000	3,480,000	1,085,000	4,195,000	1,520,000	350,000	1,250,000	8,515,000	42,985,000
December 31	14,765,000	1,470,000	6,600,000	3,895,000	1,175,000	4,405,000	1,755,000	365,000	1,250,000	8,720,000	44,400,000
Required crude runs to stills, total	118,431,000	22,550,000	84,900,000	76,900,000	37,600,000	106,900,000	30,250,000	16,250,000	11,200,000	109,900,000	615,881,000
Required crude runs to stills, per day	421,000	85,000	309,000	280,000	136,000	389,000	110,000	59,000	41,000	400,000	2,240,000
Probable straightrun yield	19.5	24.0	25.9	30.0	32.0	22.5	22.0	21.9	28.5	24.7	24.5

Includes Pipe Line Stocks Estimated as Follows:

	April 1	April 30	May 31	June 30	July 31	Aug. 31	Sept. 30	Oct. 31	Nov. 30	Dec. 31
East Coast	310,000	310,000	315,000	315,000	320,000	325,000	325,000	325,000	325,000	325,000
Appalachian	140,000	140,000	140,000	145,000	145,000	145,000	145,000	150,000	150,000	150,000
Indiana, Illinois	160,000	170,000	180,000	185,000	190,000	195,000	200,000	205,000	205,000	210,000
Oklahoma, Kansas	575,000	590,000	600,000	610,000	625,000	640,000	660,000	680,000	700,000	710,000
Inland Texas	40,000	40,000	40,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000
Louisiana Gulf	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
North Louisiana and Arkansas	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
Total	1,285,000	1,310,000	1,335,000	1,360,000	1,385,000	1,410,000	1,435,000	1,460,000	1,485,000	1,500,000

TABLE 7—FORECAST OF DEMAND, REQUIRED SUPPLY AND PROBABLE STOCKS OF GAS AND FUEL OILS LAST NINE MONTHS OF 1932 (Forecast) vs. LAST NINE MONTHS OF 1931 (Actual)
(Barrels of 42 gallons)

	East of California				California				Total United States			
	Forecast last 9 mos. 1932	Actual last 9 mos. 1931	Inc.-dec.	%	Forecast last 9 mos. 1932	Actual last 9 mos. 1931	Inc.-dec.	%	Forecast last 9 mos. 1932	Actual last 9 mos. 1931	Inc.-dec.	%
Demand:												
Domestic	173,000,000	181,427,000	— 8,427,000	— 5.2	62,000,000	64,832,000	— 2,832,000	— 4.4	234,000,000	246,259,000	—12,259,000	— 5.0
Export	6,300,000	7,442,000	— 1,142,000	—15.3	7,600,000	13,987,000	— 6,387,000	— 45.7	13,900,000	21,429,000	— 7,529,000	— 35.1
Intercoastal	.....	.....	.....	...	300,000	955,000	— 655,000	— 68.6	‡300,000	‡955,000	— 655,000	— 68.6
Total demand	179,300,000	188,869,000	—10,569,000	— 5.6	69,900,000	79,774,000	— 9,874,000	— 12.4	247,900,000	267,688,000	—19,788,000	— 7.4
Supply:												
From refinery production	164,400,000	180,911,000	—16,511,000	— 9.1	61,100,000	74,309,000	—13,209,000	— 17.8	225,500,000	255,220,000	—29,720,000	— 11.6
From imports	17,000,000	17,553,000	— 553,000	— 3.2	.....	1,465	— 1,465	— 100.0	17,000,000	17,554,000	— 554,000	— 3.2
Transfer to fuel (Cal.)	.....	.....	.....	...	†4,500,000	†2,030,000	+ 2,470,000	+121.7	†4,500,000	†2,030,000	+ 2,470,000	+121.7
From intercoastal	300,000	955,000	— 655,000	—68.6	.....	.....	.....	....	‡300,000	‡955,000	— 655,000	— 68.6
Total supply	181,700,000	199,419,000	—17,719,000	— 8.9	65,600,000	76,340,000	—10,740,000	— 14.1	247,000,000	274,804,000	—27,804,000	— 10.1
To or from stocks	+2,400,000	+10,550,000			—4,300,000	—2,434,000			—900,000	+7,116,000		
Stocks*:					96,295,066	100,885,066			126,251,000	128,740,000		
April 1	29,855,000	27,855,000			93,200,000	98,345,000			129,555,000	139,295,000		
September 30	36,365,000	40,450,000			91,996,000	97,451,000			125,251,000	135,856,000		
December 31	32,255,000	38,405,000			—3,096,000	—3,040,000			+3,304,000	+10,555,000		
Change in stocks:												
April 1 to September 30	+6,400,000	+12,595,000			—1,204,000	—1,394,000			—4,304,000	—2,439,000		
September 30 to December 31	—3,000,000	— 2,045,000			55.6%	56.4%			36.6%	37.2%		
Probable yield from crude	32.5%	32.7%										

*Includes stocks of heavy crude in California. †1931 figure abnormally low due to change in classification of crude and fuel oil stocks. ‡Intercoastal movements excluded from totals.

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GASOLINE TAXES MUST COME DOWN

Now that people have become tax-minded is the time for the oil industry to press home the inequity and iniquity of gasoline taxation.

Taxpayers aghast at the addition of a billion dollars of new Federal taxes may be in the mood to give some thought to the more than half billion dollars taken from them each year by State gasoline taxes.

Especially since one of the new federal taxes will call for another $150,000,000 on gasoline and $35,000,000 on lubricating oil.

Consumers of oil and gasoline will pay about 18 per cent of the new taxes and this on top of the more than half billion dollars already exacted by the various States.

Staggering under the heaviest tax burden in history and with lessened means to pay it the people are being aroused by sheer necessity to secure some measure of relief.

The Federal taxes are already law but if the public will bestir itself at once something may be done towards reducing the State taxes on gasoline.

Forty of the State legislatures meet next year. An immediate popular campaign should be begun to impress upon members and candidates for those bodies that the people demand they reduce the present state tax on gasoline.

It is no longer a matter of protesting against any further increases but of reducing the existing rates in view of the additional Federal tax and the reduced paying power of the public.

People everywhere are demanding reduction in taxation too heavy to be borne. Here is a concrete case where a cut can be insisted upon with prompt relief.

With the Federal government piling on an additional billion dollars to balance the budget something will have to give way and the more than half billion dollars taken by the States in extortionate taxes on gasoline offers the opening.

There is no other way in which taxpayers can get so much and so speedy relief as by compelling those forty legislatures that meet next January or soon thereafter to reduce their gasoline tax rate in line with the times.

The average state rate is now over four cents a gallon and with the new Federal tax will be over five cents, or almost 30 per cent of the cost to the consumer.

Contrast this 30 per cent with the new Federal tax of three per cent on electricity and notice what happened.

This tax on electricity, as originally put into the tax measure was to be paid by the power companies, but as the bill came from the conference committee and was passed by House and Senate the tax was levied directly on the consumer.

How important this little three per cent tax was considered by the utility companies and those interested in utility investments was shown by the stock market advance of from one to three points in utility shares when the tax was passed on to the public.

What would they or what would users of electricity think if they were paying a 30 per cent tax like the gasoline consumer?

It is hard to understand the mental processes of those who stampeded the House and Senate in fear of a one and half per cent general sales tax and yet calmly assented to adding another five per cent tax on the gasoline consumer already paying 25 per cent sales tax on the price of every gallon he buys.

This, of course, is the consumer's side only. But the oil industry has an equal grievance.

So long as the state tax was two cents and the money was spent on road improvement exclusively there was no protest. Motorists were getting their money's worth in highways and there was general benefit in the employment of labor and industry in road construction and in quickened transportation for produce and goods.

But with the steady increasing of the rate came demoralization. Easily collected taxation encouraged legislative and administrative extravagance and ultimately the diversion of the motorist's money to purposes for which he had no more right to pay than anyone else.

Nor did it stop there. As the tax increased crooks saw a profit in evading it and the gasoline tax racket soon rivalled the liquor racket as easy money.

The situation was tersely summed up by Burton W. Musser in his address during the A. P. I. sessions in Tulsa:

"The gasoline tax should be reduced; because at its present rate it directly induces tax evasions and tax fund diversions, and makes the blending and sale of inferior products profitable. It breaks faith with the motorist, lessens the use of the automobile, gives a premium to the bootlegger, penalizes the honest distributor, corrupts the office holder, demoralizes the dealer, makes a perjurer out of the exemption claimant and a spendthrift out of the highway commissioner."

"The inevitable consequence," as Earl W. Sinclair said in his speech, "is a demoralized market condition—the bootlegger and crook being the beneficiary and the honest marketers, the state and the industry the losers. Unreasonably high rates of taxation are the direct cause of evasion."

A great deal has been said of the hope that the oil industry can lead the country out of its depression. Increasing the tax on gasoline is certainly not the way to help.

The consumer can be pushed just so far, State legislators have gone carelessly ahead increasing the tax on gasoline without counting on the effect as shown in the fact that the states having the highest gasoline tax are those showing the decrease in consumption.

In these times, with all these new Federal taxes drawing on the lessened paying power of the public, taxpayers must seek escape by consuming less.

There is a limit to what the taxpayer can bear and when it is reached the revenue fails to come in. A tax that decreases business is not going to help the country out of the hole.

Taxation is the biggest issue of the day. It is non-partisan and universal in its appeal. Taxes must be cut to the bone, just as incomes have.

The gasoline tax is exorbitant as a burden upon any one industry, extortionate on the consumer, wasteful in public expenditures and an inducement to law breaking.

Reducing it to manageable proportions should be the first job of these forty legislatures when they meet. It will be if the people let the legislators and legislative candidates hear from them.

The oil industry can do most to arouse the people. Let it make every filling station, every garage in the country a center of agitation for a reduction in the gasoline tax in each state. Let it take it up with every affiliated industry and business and invite the public to tell their representatives in the legislatures what must be done.

Gasoline taxes must come down.

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New Federal Taxes Stimulate Buying

Government Tax of 1 Cent on Gasoline and 4 Cents on Oils Brings Buyers Into Refinery Market

By C. O. Willson

Due entirely to the stimulation brought about by the passage of the federal revenue bill providing for a 1-cent tax on gasoline effective June 21, the refinery tank car market in Oklahoma and other Mid-Continent refining areas pointed upward over the past few days. This upward trend became apparent the latter part of last week and when it became definitely known on Tuesday that the bill had been passed and signed additional impetus was given to higher quotations on the part of refiners.

Although the effect was not so apparent as in the case of gasoline, the 4-cent tax on lubricating oils which is another provision of the revenue bill had increased purchases of all oils from Mid-Continent refineries and predictions that prices would advance before the end of the week were heard in the trade.

Little change was noted in the price position of other products during the week. Kerosene quotations continued to slump and in Oklahoma are one-fourth cent lower than they were a week ago. The latter part of last week all grades of natural gasolines slumped in price but on Saturday and the first two days of this week buying improved and prices recovered. It was expected that naturals would reflect additional improvement in the refinery gasoline market.

Representative opinion in the trade on Tuesday indicated that the opportunity to make purchases of all grades of gasoline and lubricating oils before the federal excise taxes become effective may result in the most active market in the recent history of the Mid-Continent Field. The provisions as finally enacted are shown on the opposite page including the import taxes which are expected to have some influence on domestic quotations at coastal points and thus indirectly affect Mid-Continent and other interior markets.

There was some confusion as to the scope of the 1-cent domestic tax on gasoline and the 4-cent lubricating oil tax. Although the tax is a manufacturer's tax to be paid by refiners and other manufacturers of motor fuels and lubricating oils it is not clear in all cases just who will pay the tax. The tax on storage at refineries and refinery owned bulk storage was one of the matters regarding which there was disagreement as to the tax due. It is probable that rulings by the revenue department will be necessary before these matters can be cleared up and all applications of the law generally understood.

Regardless of these later interpretations it is certain that the next 15 days offers an opportunity for jobbers of gasoline and lubricating oils to purchase from refiners who will not be compelled to pay the taxes until June 21. This applies both to spot purchases and sales on long-time contracts. It is believed that jobber storage is below the average for this season of the year and this is one of the conditions pointing to heavy purchases.

From the refiners' viewpoint leading executives are urging the operators not to be deceived by the probable heavy demand over the next two weeks. It is pointed out that while this buying will provide a feast while it lasts a famine in buying is certain to follow. Refiners are urged to budget their operations to take care of both conditions.

The heavy buying provides an opportunity for refiners to reduce their inventories of gasoline and place themselves in a stronger statistical situation over the balance of the summer. At the same time prices can be advanced to the point in line with prevailing costs. Many refinery operators never have been able to advance their prices on refinery products so that they are able to show an adequate profit in their plant and sales operations taking into consideration the present posted schedules for crude oil. A low of 5 cents for the low octane U. S. Motor gasoline represents what many refiners believe to be the dividing point between profit and loss in their plant operations. This significance of the gasoline price in the operations of refineries is of course influenced by the prices received for other refinery products, none of which appears to be in a position to support higher quotations at this time.

It is contended if refiners increase their crude runs to stills to take care of this temporary bulge in demand rather than reduce their inventories, a substantial reduction in gasoline quotations is assured after the federal tax becomes effective. Jobbers who fill their storage over the next two weeks no doubt will reduce their contract and spot buying as soon as the tax becomes effective until such time as the storage is depleted. This slump in demand at refineries will result

REFINED MARKET BAROMETER

The enactment of a bill providing for excise taxes on gasoline and lubricating oils overshadowed every other development in refinery markets. The passage of the revenue bill providing for taxes served to stimulate buying of these products by jobbers from refiners before the collection of the taxes starts. Due to this demand refiners in some areas have advanced their tank car prices while in other sections no changes have been made. The movement of lubricating oils also materially improved with no important price changes announced. Kerosene quotations were reduced during the week in areas where any changes were reported. Natural gasolines strengthened in the Mid-Continent. Wax prices unchanged.

Mid-Continent—Most refiners advanced tank car prices on gasoline from one-fourth to one-half cent per gallon. Heavy movement of lubricating oils. Kerosene slow and prices lower. Slow movement of furnace oil and tractor fuel. Heavy fuels firm. Natural gasoline strong.

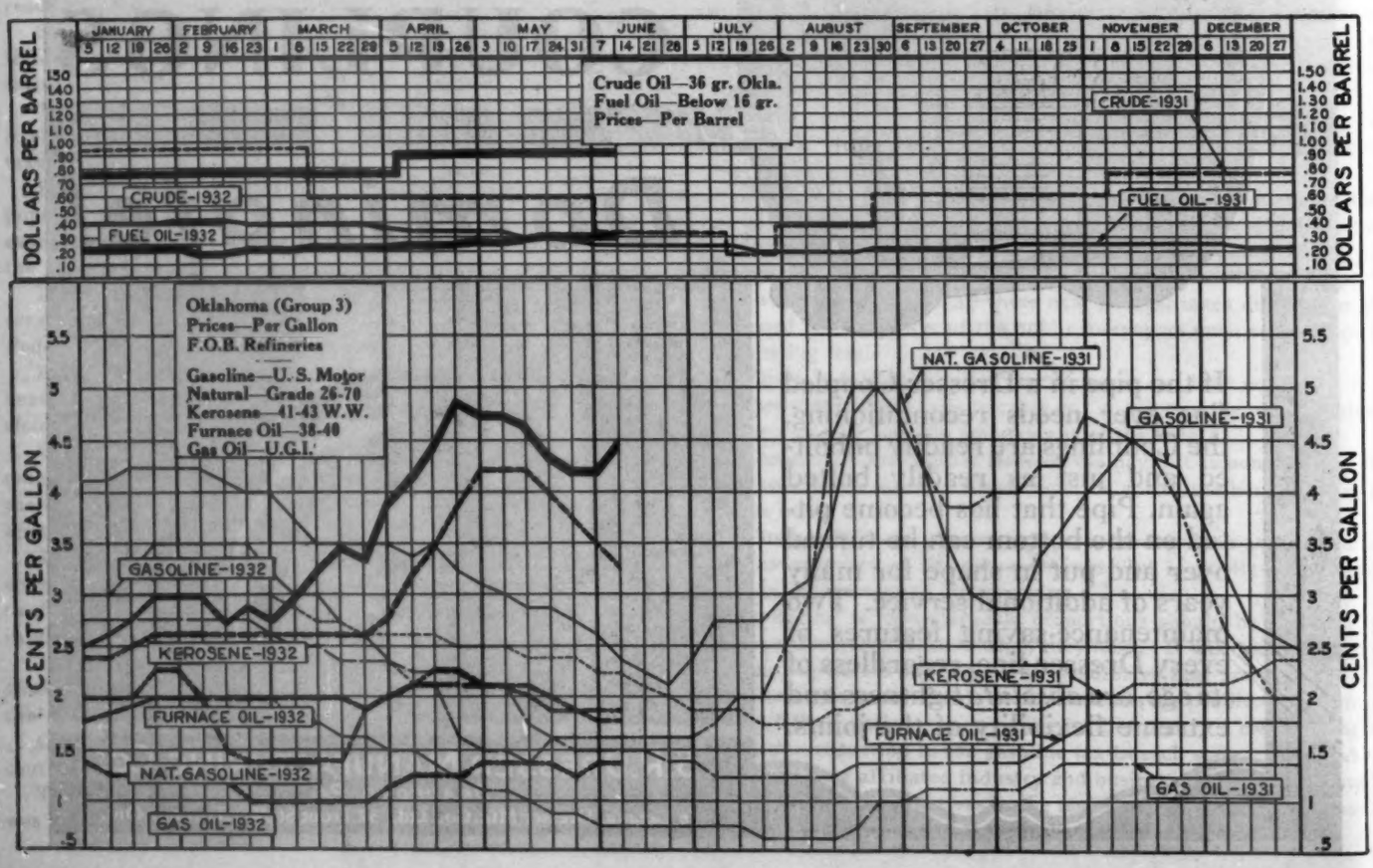
East Coast—Improved demand for gasoline at firm prices. Kerosene slow. Diesel oil quotations advanced. Bunker fuels firm. Slow export and domestic demand for wax. Few export inquiries.

Pennsylvania—Prices generally firm. Better demand for cylinder stocks and gasoline. Kerosene less active.

Gulf Coast—Prices unchanged. No new foreign business on gasoline. Fuels firm.

California—Gasoline prices for domestic movement lower. Better demand for fuel oils at lower prices.

Chicago—Demand for gasoline improves first of week and prices reflect strength. Kerosene prices lower. Routine trading in other products.



in price declines which will more than offset the advantage of the heavy buying, if refinery operations are not controlled both before and after the tax becomes effective.

Sellers state that this situation is of even greater importance in the case of lubricating oils. The consumption of lubricating oils is relatively small when compared with gasoline and jobbers with storage facilities can easily buy to cover several weeks and in some cases several months' requirements before the 4-cent tax becomes effective. Thus the demand for oils after the effective tax date may be very slow over a long period.

At least one refiner urges caution in estimating the probable demand over the next two weeks. He claims that due to financial conditions relatively few jobbers are in a position to finance storage programs at their bulk plants. He said that so far as his own company was concerned, no special credit will be extended to jobbers in order to aid them in filling their storage and he predicted that most refiners would take the same position. Refiners have been compelled to tighten their credit operations in recent months and this fact accounted for the failure of many jobbers to fill their storage earlier in the year.

Gasoline and Naphtha

Quotations on refinery gasolines varied widely the first of the week. Steady buying on Friday, Saturday and Monday apparently had absorbed all the resale U. S. Motor gasoline of low octane rating available at 4 and 4¼ cents and on Tuesday the low price to the trade was 4½ cents. Several refiners had advanced their quotations to 5 or more cents. Although there was little buying at the top prices, the refiners expressed confidence that would be the prevailing market before the end of the week.

Orders on contracts were exceptionally heavy. In some cases jobbers have ordered out the entire quantity permitted on their contracts for June and have asked for additional material to be shipped before the fifteenth of the month. There also was some speculative buying on the part of resellers.

The usual price relationships between the high gravity and low endpoint gasolines and the U. S. Motor grades is being maintained, although there is very little spot trading in the high gravity material. Naphthas for blending are active and prices are one-fourth cent higher.

Natural Gasolines

All manufacturers reported improved buying on Monday and Tuesday. Some are sold up for the first half of June. The 26-70 grade was moving in Oklahoma at 1¾ to 1⅞ cents and the 18-55 grade at a low of 2¼ cents. The lower vapor pressure grades were particularly strong. Eleven-pound material was bringing a low of 3¾ cents and 9-pound 4 cents on Tuesday.

Other Products

The 41-43 water white kerosene dropped to a low of 3¼ cents the first of the week. The demand was more active at that figure. All grades of fuel oil and gas oil are unchanged. Finished motor oils and stocks are active.

New Taxes Applying to Petroleum Industry

The following provisions of the revenue bill signed by President Hoover on June 6 applying to crude petroleum and refinery products will become effective June 21:

DOMESTIC EXCISE TAXES

Lubricating Oils

"Lubricating oils, 4 cents a gallon; but the tax on the articles in this paragraph shall not apply with respect to the importation of such articles.

Gasoline

"(a) There is hereby imposed on gasoline sold by the importer thereof or by a producer of gasoline, a tax of 1 cent a gallon, except that under regulations prescribed by the commissioner with the approval of the secretary, the tax shall not apply in the case of sales to a producer of gasoline.

"(b) If a producer or importer uses (otherwise than in the production of gasoline) gasoline sold to him free of tax, or produced or imported by him, such use shall for the purposes of this title be considered a sale.

"(c) As used in this section:

"The term 'producer' includes a refiner, compounder, or blender, and a dealer selling gasoline exclusively to producers of gasoline, as well as a producer.

"The term 'gasoline' means gasoline, benzol and any other liquid the chief use of which is as a fuel for the propulsion of motor vehicles, motor boats, or airplanes."

A special section of the bill provided that if any bona fide contract was made for the purchase or sale of commodities covered by the special excises prior to May 1, 1932, the purchaser shall be required to pay the tax, it being assumed that the seller was aware on and after that date that such excises were to be imposed and, therefore, could have added, if he so chose, the amount of the tax to the bill for the goods.

Another section provides that the manufacturers or importers liable for the excise taxes shall make monthly returns to the collectors of internal revenue for their respective districts.

IMPORT TAXES

"Crude petroleum, one-half cent per gallon; fuel oil derived from petroleum, gas oil derived from petroleum, and all liquid derivatives of crude petroleum, except lubricating oil and gasoline or other motor fuel, one-half cent per gallon; gasoline or other motor fuel, 2½ cents per gallon; lubricating oil, 4 cents per gallon; paraffin and other petroleum wax products, 1 cent per pound. The tax on the articles described in this paragraph shall

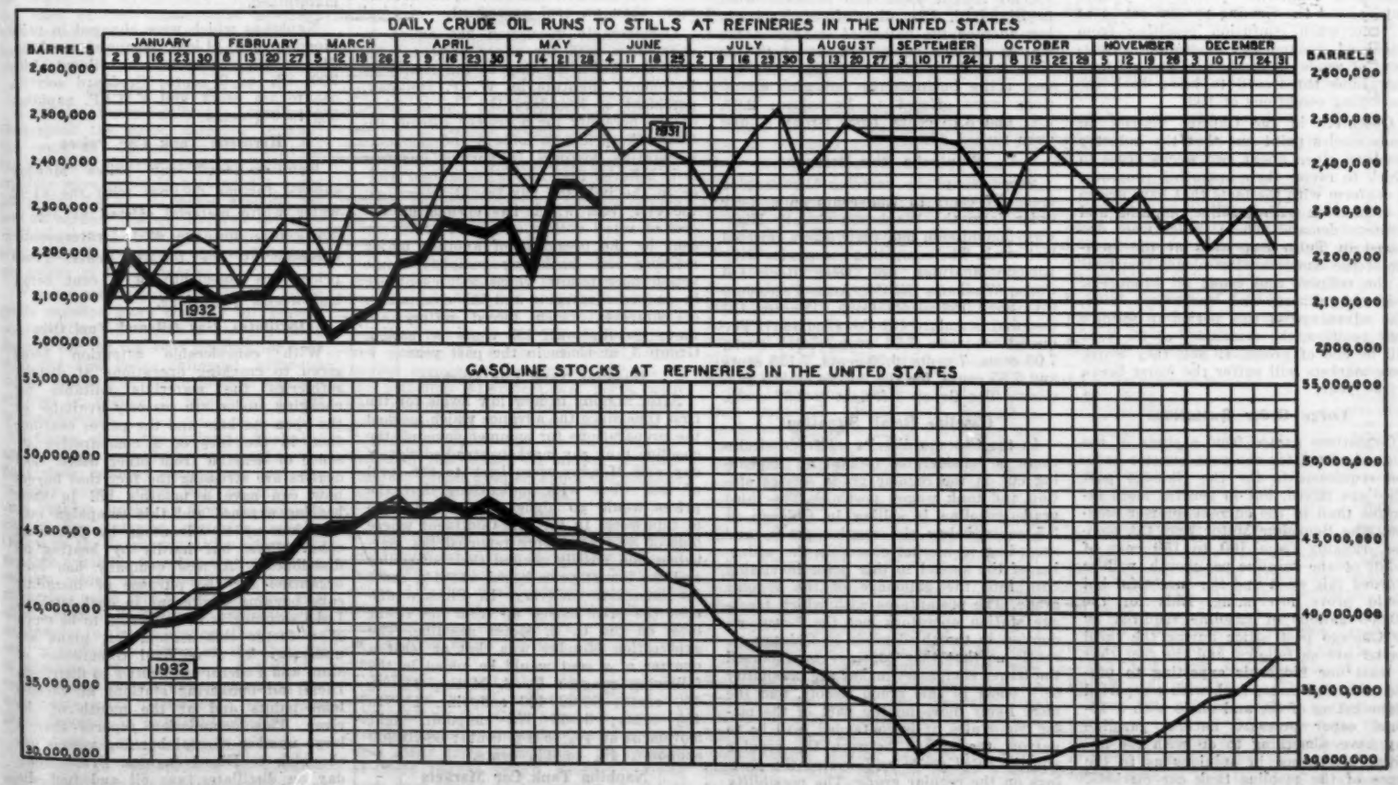
(Continued on Page 47)

AMERICAN PETROLEUM INSTITUTE WEEKLY REFINERY STATISTICS

The weekly report made to the American Petroleum Institute on refinery statistics—crude runs to still, gasoline stocks and gas and fuel oil stocks in barrels—for the week ending June 4:

	Week ending June 4, 1932				Week ending May 28, 1932				Week ending May 30, 1931			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
East Coast	100.0	474,600	6,634,000	6,492,000	100.0	481,600	6,515,000	6,420,000	100.0	496,700	8,267,000	8,738,000
Appalachian	91.8	94,900	1,755,000	1,022,000	91.8	99,000	1,721,000	1,035,000	93.8	96,600	1,600,000	1,140,000
Indiana, Illinois, Kentucky	98.9	288,100	6,358,000	4,050,000	98.9	290,200	6,318,000	4,029,000	97.5	324,700	6,336,000	3,734,000
Oklahoma, Kansas, Missouri	89.6	222,300	3,878,000	3,221,000	89.6	234,700	4,009,000	3,310,000	89.4	276,000	3,645,000	4,284,000
Texas	91.3	558,400	7,797,000	9,843,000	91.3	549,000	7,788,000	9,138,000	91.9	575,400	7,340,000	9,330,000
Louisiana and Arkansas	98.9	156,700	1,825,000	4,679,000	98.9	169,100	1,840,000	4,653,000	98.3	176,200	2,383,000	2,427,003
Rocky Mountain	89.4	28,300	2,001,000	639,000	89.4	36,600	2,047,000	660,000	93.1	48,100	1,905,000	842,000
California	96.7	437,700	13,999,000	97,102,000	96.7	459,100	14,099,000	97,415,000	98.8	480,900	12,769,000	98,337,000
Total United States	95.1	2,261,000	44,247,000	127,053,000	95.1	2,319,300	44,337,000	126,660,000	95.7	2,474,600	44,795,000	129,463,003
Texas Gulf Coast	99.8	446,400	6,229,000	6,835,000	99.8	441,300	6,207,000	6,245,000	100.0	433,400	6,642,000	6,977,000
Louisiana Gulf Coast	100.0	101,100	1,625,000	3,954,000	100.0	116,100	1,670,000	3,883,000	100.0	118,400	2,226,000	1,491,000

(1) Per cent refinery capacity represented. (2) Daily crude runs to stills. (3) Gasoline stocks. (4) gas and fuel oil stocks.



All data based on weekly reports of the American Petroleum Institute. Figures for last week not shown in graph but are included in above table.

Gasoline Buying Improves in Chicago

Purchases in Anticipation of 1-Cent Federal Tax Stops Decline in Tank Car Market. Kerosene Quotations Lower

By Robert C. Conine
Chicago Bureau, The Oil and Gas Journal, 4 North Michigan Ave.

CHICAGO, June 6.—Chicago district marketers and jobbers are reported to be making preparations for the 1-cent advance expected in the gasoline tank car markets when the Federal excise tax on this product becomes effective shortly after the signing of the budget balancing bill by the President. On Monday gasoline buying improved.

Previous to the announcement of the 1-cent federal tax the gasoline tank car markets in the Chicago district were on the decline for more than a week. After earlier sagging the markets were able to resist further declines when the holidays offered some relief. Consumption over the period was favorable but the lower price quotations coming later in the week were a clear indication that shippers had badly miscalculated in the matter of supply and demand. To add to the troubles from excess gasoline in the district, which resulted in 4-cent gasoline to the trade, Oklahoma marketers chose the opportunity to offer U. S. Motor material to jobbers at 3¾ cents. These low prices to jobbers from the Mid-Continent took Chicago district oil trade circles by surprise, as the reports of further curtailment of crude oil production and runs to stills were beginning to bring a better tone into the markets. On Saturday most of the dark clouds were dispelled when marketers set out to pick up this cheap gasoline and found that it was no longer available. The prospective 1-cent advance due to the Federal gasoline tax levy Monday was promising additional profits to prompt buyers, and the firming process set in at a time when confusion resulting from slackened demand and inadequate adjustment of crude oil production and refinery operations threatened to bring back the marketing conditions of 1931.

Observers in the Chicago district oil trade circles point out that the industry has been given about two weeks grace in which to revise their operating programs to conform with the facts that have arisen in connection with gasoline, naphtha and kerosene demand. These things were discussed in Tulsa last week at the meeting of the American Petroleum Institute. If the refiners and crude oil producers, Chicago refiners and marketers aver, take advantage of this period to solidify their position, the remainder of the year will be one of profit. If not, they warn, these markets will suffer the worst break of the year.

Large Order Quotations

Indications gained from a study of the bids submitted for the next quarter gasoline requirements for the Chicago post office are mixed, but in general more favorable than in the current quarter business. The Bensoline Motor Fuel Co. business, ranging from 100 to 150 cars of middle octane gasoline per month, will be awarded this week and the successful bid should prove interesting. Bids for the 250,000 gallons of gasoline required by the Chicago post office during the third quarter are as follows, and the fact that at least one bidder is expecting to provide a blended motor fuel, with a reported octane rating of 68, and made with a 15-pound vapor pressure natural gasoline may have something to do with the apparent divergence in opinions as to the future of the gasoline tank car markets.

Bidding on the Group 3 basis: Deep Rock Oil Corp., 0.375 cent below average tank car price, with maximum of 4.875 cents, and handling charge of 0.24 cent, discount 1 per cent, 10 days; Jewett & Sowers Oil Co., 0.125 cent below average tank car price, with maximum of 4 cents, and handling charge of 0.45 cent, discount 1 per cent, 10 days; Wells Petroleum Co., 0.25 cent below average tank car price, with maximum of 6 cents and handling charge of 0.25 cent, discount 1 per cent, 10 days; Seneca Petroleum Co., 0.125 cent below average tank car price with maximum of 5.4 cents and handling charge of 0.4 cent, discount 1 per cent. 10 days.

Bidder's bulk plant prices: Apex Motor Fuel Co., 0.125 cent below average tank car price, no maximum specified, handling charge 0.45 cent, plus freight; Shell Petroleum Corp., 1.745 cent above average tank car price, maximum of 6.62 cents; Standard Oil Co. (Indiana), 0.125 cent below average tank car price, maximum of 5 cents, and handling charge of 1.87162 cents and discount of 1 per cent, 10 days.

These may be compared with the bids tendered for the current quarter post office business: Deep Rock bid a quarter of a cent below average tank car price with 4.25 cents maximum, and 0.5 cent handling charge; Jewett & Sowers bid one-eighth of a cent below the average tank car price with 4.5 cents maximum and 0.5 cent handling charge. On flat rate basis: Deep Rock bid 4 cents plus freight from the Group, and 0.5 cent handling charge. Bidder's bulk plant propositions: Deep Rock bid 6.94 cents, Chicago; Pure Oil Products Co. bid 2.92 cents above the low with 7.22 cents maximum; Standard Oil Co. (Indiana) bid one-eighth cent below the average tank car price with maximum of 4.25 cents, Group 3, and refund on Government's special freight rate. The business went to Standard. Benzoline Motor Fuel Co. has adopted the policy of secrecy in the matter of bids submitted. At about the time the above bids were made for the post office business the following quotations were offered to Bensoline: 2.60, 2.81 and 3.75 cents, basis Group 3, and were turned down.

Waukesha Bids Refused

Seven companies entering bids ranging from 6.7 cents to 7.55 cents on a 3-car order from the Waukesha County Highway Commission had their offers rejected last week. The competing companies were Lindsay-McMillan Co., Deep Rock Oil Corp., Wadhams Oil Co., Acme Petroleum Co., Shell Petroleum Corp., Penotex Oil Co., and Standard Oil Co. (Indiana). The quotations were 7.54 cents, 7.045 cents, 7.05 cents, 7 cents, 6.70 cents, 7.125 cents and 7.55 cents, for the middle octane gasoline. The Group 3 freight is 2,67 cents.

Gasoline Retail Situation

In the Chicago district oil trade circles there is considerable talk of an impending cut in the regular grade service station and tank wagon postings. The third grade gasoline is selling in Chicago at 3.5 cents below the regular grade, and according to market observers the widening of the spread to this point inevitably cuts into the gallonage of the regular grade. The promptness with which trackage station operators met the 1-cent reduction in the third grade in Chicago recently so that they continue to undersell the larger companies makes the possibility of a boost in this grade remote, and the most likely move on the part of the major companies, it is contended, will be to narrow the spread between the regular and the third grade by lowering the postings on the regular grade. The possibility of a cut in the regular grade is further indicated by the fact that the trackage station operators are selling a motor fuel of fine quality in competition with the third grade which has unjustly become identified with inferior material. The third grade gasolines of the major companies, recent tests show, range in octane number from 49 to 57.6, and from the standpoint of recovery and distillation curve they are superior to most of the much touted trackage station gasolines. In the matter of antiknock rating in the regular grades, some of the gasolines of the major companies show octane number loss as the volatility has been reduced to meet summer conditions. Two majors, however, are making every effort to lead the field in antiknock rating. One of the largest marketers in the territory expects to hold to a gasoline of 70 octane or thereabouts, in the regular grade until facilities at its various refineries are completed for producing a 70 octane number gasoline with ease. The competition of the trackage stations with high antiknock, low initial gasolines is expected to continue until the natural gasoline markets gather strength which they now give no indications of having. The latest reduction in the third grade gasoline service station price was in Minneapolis where the posting was cut 0.5 cent to 12.5 cents. As pointed out recently in these columns Minneapolis is beginning to experience the tactics of underselling refiners who quote three-eighths of a cent below the low of the spot markets. The refiner who is supplying a Chicago distributor on this basis and giving a bonus of an eighth of a cent on quantities of over 100 cars a month defends his practice on the ground that this distributor does not sell on the open market. However, various brokers say that they can buy from this distributor at any time at a quarter of a cent below the low of the open markets upon nothing more than an oral agreement.

Considerable discussion has arisen in connection with the paper presented before the Tulsa meeting of the American Petroleum Institute by W. T. Holliday, president of Standard Oil Co. of Ohio, on the necessity for narrower spreads between the prices to jobbers and the service station postings. In various quarters it is believed that now a recognized leader in the industry has frankly discussed the evil from which has sprung an excess of retail outlets estimated at 75 per cent by the president of another major refining and marketing company, some action may follow which will eventuate in narrower margins and the elimination of contracts which forced refiners to move gasoline at 1.5 cents a gallon, Group 3, at times in the past year.

Gasoline Tank Car Markets

After sagging to new low levels for the first time since the advance which marked the preparations for summer demand, the gasoline tank car markets steadied Saturday and Monday were back to the level of last week with indications that the prices would go higher before the close of this week. In the Mid-Continent where bids of 3¾ cents were reported the marketers had hastily revised their schedules and the lowest price heard was 4⅛ cents for immediate delivery. In Chicago district the price moved up from the 4-cent level on the U. S. Motor gasoline. The expectation Monday was that at least a quarter of a cent would be added in the following ranges: U. S. Motor, 4¼ to 4⅜ cents; 60-62 400 endpoint, 4⅜ to 4½ cents; 64-66 375 endpoint, light movement at 4⅝ to 4¾ cents; 68-70 360 endpoint, 4¾ to 4⅞ cents.

Naphtha Tank Car Markets

The naphtha tank car markets have proved more erratic than the gasoline markets. On Monday four of the special naphthas had advanced from a quarter of a cent to half a cent, and were beginning to look firm. An interesting fact was the sale of 75 cars of Michigan "gasoline" to a Detroit buyer for use in price cutting competition. A Michigan gasoline sold in Detroit has an endpoint of 387°; initial of 90°; gravity of 79.7° and octane number of 46. The sale of this gasoline represents the removal of considerable potential naphtha from the picture. The bulk of gasoline refined in a Chicago plant from Michigan crude is now being taken by a major company. This gasoline has been offered to the trade at 0.75 cent below the low of the spot markets.

Committee D, of the U. S. Bureau of Standards, is expected this month to make its recommendations in connection with the proposed change in the specifications for Stoddard solvent. In the Chicago district it is said that if the new specifications become official the price must be advanced 1 cent at least at a time when dyers and cleaners are barely keeping their heads above the water. To keep to the 100° flashpoint requirement and lower the endpoint for better drying time it will be necessary to narrow the cut and increase the cost of operation. It has been recommended that the Stoddard solvent should distil as follows: Initial, 300°; 50 per cent point, 330°; 80 per cent point, 340°; 95 per cent point, 360°, and endpoint, 400°, with minimum flashpoint of 100°. A counter proposal by naphtha manufacturers calls for the following: Waiving of the initial, 95 per cent point and flash, with the specifications expressed: Not less than 50 per cent at 330°; not less than 80 per cent at 350°, and minimum flash of 80°, so that current prices may be maintained.

Naphthas which were changed in price Monday are: Light cleaners' naphtha, 6¼ to 6½ cents; lacquer diluent, 140-200, 8¾ to 9 cents; Stoddard solvent, 5½ to 5¾ cents, and V.M.&P. naphtha, 5½ to 6¼ cents.

Kerosene Tank Car Prices

Kerosene tank car prices Monday showed further declines with the 41-42 water white material offered at 3½ to 3¾ cents, and the 42-44 water white kerosene at 3⅝ to 3⅞ cents. These prices are one-eighth of a cent below last week's quotations.

Distillates, Gas Oil and Fuel Oils

With considerable attention being given to cracking operations at district refineries the materials suitable for charging stocks are scarcely available on the open markets and the prices continue firm in the face of a comparative absence of demand from other users. Coal dealers are stressing the fact that buyers now can save a month's bill in their heating expense and this campaign may be taken up to advantage by petroleum coke sellers, but hardly by heating oil distributors. A new company has been organized for the purpose of installing coke burning equipment in coal burners. Lake shipping is not expected to be much of a factor this season, but plans are underway by a regional commission of state and Federal authorities to distribute Diesel oil bunkering stations at various lake points and at the mouth of the river. This commission reports that a large number of coal burning vessels are changing to Diesel engines. Prices Monday on distillates, gas oil and fuel oils were unchanged from last week.

Steady Undertone in Eastern Markets

Foreign Gasoline Situation Concerns Trade as World Conference Ends. Rumanian Gasoline at Low Prices

By A. E. Mockler

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NEW YORK, June 6.—With domestic markets showing a steady undertone throughout the past week, interest in trade circles here has centered mainly on the foreign situation. The culmination of the international petroleum conference here, in an apparent stalement, has renewed interest in the foreign oil situation, not only with regard to the probable trend of American gasoline exports, but with respect to the question of further import movement of gasoline as well.

Unconfirmed reports during the week indicate that 67 octane Rumanian gasoline had been offered for prompt and nearby shipment at as low as 3⅝ cents per gallon, laid down at Montreal. In view of the Canadian import and dumping duties, it was considered likely that this quotation would appeal more to American marketers whose terminals are within easy reach of Montreal by water. Even with an import duty of 2½ cents per gallon and incidental handling charges, the Rumanian product could be laid down at distributing points in the Great Lakes area at a price approximating the open market basis in the Mid-Continent and the Chicago refining area. Reports of these further offerings indicate the possibility that the recent shipments of Rumanian gasoline into Detroit, some of which came via Montreal, may prove only a forerunner of a regular movement of the Rumanian product. In this connection, reports that American oil companies were to seek shortly a conference with the Rumanian oil industry, much along the lines of the unsuccessful meetings with Soviet representatives just held here, have aroused considerable interest in oil trade circles.

Refinery Gasoline

A fairly heavy gallonage continued throughout the week, carrying forward the spurt in consumption evident over the previous holiday week-end. Locally, markets were strongly held at 6¾ cents per gallon for U. S. Motor gasoline below 65 octane number, in tank car lots, with motor fuel of 65 octane number and above quoted at a range of 7 to 7¼ cents per gallon at the refineries.

Warmer weather has made the lower grade gasoline more suitable for general use, and there has been a heavy jobbing demand for the 6¾-cent product for both tank car and barge shipment, although the 65 octane and above product has not suffered in volume to any great extent in consequence.

Refiners along the Atlantic Seaboard are showing a tendency to continue to limit their refinery operations, and apparently every effort will be made to pare surplus stocks as much as possible during the summer motoring season. Owing to the large quantities of surplus gasoline available in other sections of the country, which can be laid down here at attractive price levels, refiners here can adhere to their curtailment program with confidence, in the assurances that cargoes can be picked up either at the Gulf or in California to round out distributing requirements should any unforeseen developments make necessary a temporary heavy increase in available supplies.

Tank Wagon Gasoline

Contrary to expectations, no advance was made in tank wagon and service station prices in metropolitan New York area during the week just ended, the market holding at the levels established a fortnight ago by the 4-cent cut in the retail price, bringing leading brands down to 8 gallons for $1, including the state tax of 3 cents a gallon, at filling stations. While "competitive brands" can be bought at 9 gallons for $1, tax included, in isolated instances, the general market appears pretty well stabilized at 12½ cents at the filling stations, and the market undertone has apparently firmed up to the point where an increase of 1 or 2 cents per gallon would be successful. The expected federal tax of 1 cent per gallon, however, will tend to complicate the tank-wagon market situation to some extent.

Reports from the remainder of East Coast marketing territory indicate fairly stable markets prevailing, although isolated price cutting is still existent in a few sections, which may possibly force action as drastic as that taken by the major marketers in the New York City area recently.

An interesting development during the week was the announcement that Warner-Quinlan Co., operating a large chain of service stations in metropolitan New York, and with scattered retail stations at other points in the territory, would take on the distribution of Cities Service gasoline and refined products. This development bears out reports in financial circles indicating that Cities Service some time back had acquired a controlling stock interest in the Warner-Quinlan Co., whose refinery at Warners, N. J., manufactures the "Super-X" and "Mileage" gasolines hitherto distributed by that company.

Third grades are still being held in the background and it is not expected that the major interests will emphasize this feature of marketing this summer unless forced to it by competitive conditions.

Kerosene

Refinery shipments of kerosene continue at low levels, and the price basis remains unaltered. Posted prices for 41-43 water white in tank car lots range 5½ to 6 cents per gallon, with the bulk of the limited volume passing going through at the inside figure.

Tank wagon kerosene sales have shown a little increase during the period under review, and quotations are without change in all parts of the territory.

Fuel Oil

Continued firmness characterized this branch of the market during the week, and the possibility of a further early increase in the posted price schedule has not been lost sight of. Principal refiners are posting 75 cents per barrel, f.o.b. harbor terminals, for bunker "C" oil at the principal Atlantic Coast ports, with the exception of Philadelphia, where prices range 75 to 80 cents per barrel.

Refiners report that the statistical position of the bunker oil market is working into firmer ground, and are optimistic regarding the price outlook.

Diesel Oil

This division of the market was without important change throughout the past week. The posted price at New York and other Atlantic Seaboard terminals holds unchanged at $1.50 per barrel, bulk, and refiners report that gallonage is well up to expected totals for this season of the year.

Refiners report that the recent increases in posted prices for Diesel oil here and at the Gulf have not diverted any appreciable amount of marine business away from these ports. A number of lines in the South American trade have been taking on oil supplies at Trinidad right along, and with this business definitely lost to American refiners, the price increases have not had any adverse effect on aggregate gallonage.

Gas Oil

Contract withdrawals on the part of the large eastern utility companies continue along routine lines, daylight saving naturally having an adverse effect upon consumption.

Refiners are posting 28 gravity plus recycled oil at 4 cents per gallon in tank car lots, f.o.b. harbor terminals, and while contract shipments are going out at as low as 3½ to 3⅝ cents per gallon in some instances, the inside price on spot sales appears to be ranging 3⅞ cents to the posted level.

Wax

Domestic consumption of paraffin wax is not coming up to expectations, it is reported, and refiners with heavy surplus stocks on hand are entertaining bids at price concessions in many instances. This has naturally affected the spot market adversely, and while quotations are without change this week, the list is more or less nominal, and susceptible to fractional price shading on some melting points.

Export inquiry for crude scale and fully refined has picked up a little, and foreign buyers are showing a little more interest in semirefined, but the amount of actual new business for shipment abroad has continued rather light.

Lubs

Spot demand eased off somewhat this week, but the market continues in steady position, and prices are well maintained at recently advanced levels. Jobbing demand appears to have been taken care of, for the moment, and traders are looking for a slight spell of quiet until current stocks of distributors are worked off.

Continued quiet characterized the industrial lub oil market during the week. Domestic consumers are ordering forward stocks only as actually required, and tank car movement from the refineries is rather light. Export inquiry for red and pale oils has also slackened.

Gulf Export Market

There were no cargoes of either gasoline or kerosene reported closed at the Gulf during the week, and no new inquiries appeared. Prices at the Gulf continue nominal, although the market undertone is decidedly easy in some quarters, with sellers quoting only on direct inquiry.

Export operators were disappointed at the unfavorable outcome of the world conference here, although slightly cheered by indications that negotiations might be resumed abroad later with the participation of all of the interested nations with the exception of the Soviet.

The indications that an early conference would be sought with Rumanian producers and refiners, in particular, has developed a better sentiment in exporting circles, as Rumania has vied closely with Russia as a disturbing factor in export markets during the past few years.

Venezuelan crude continues to show firmness, with sellers quoting 62 to 63 cents per barrel, f.o.b. The market for Panuco, Mexico, heavy crude is also strong, at 48 cents per barrel, f.o.b., plus the usual Mexican government taxes.

Petroleum Exports

Continued quiet is reported in the local export market, and relatively little new business is reaching operators here. Inquiries from abroad are generally confined to small quantities, for prompt shipment, with practically all of the large consignments moving representing intercompany trading between major American units and foreign marketing subsidiaries or affiliates.

The following table shows exports of principal refined petroleum products from the port of New York for the past three weeks (all figures in gallons unless otherwise noted):

	Week ended		
	May 28	May 21	May 14
Gasoline	25,000	55,000	77,000
Naphtha	.....	70,000	610,000
Kerosene	7,000	100,000	106,000
Fuel and gas oil	219,000	258,000	14,000
Lubricating oil	860,000	615,000	745,000
Petroleum, ref'd	25,000	320,000	305,000
	Pounds		
Petrolatum	.....	.....	35,000
Paraffin wax	695,000	565,000	2,210,000
Refined	115,000	180,000	60,000
Scale	85,000	10,000	150,000
Lub. grease	730,000	365,000	645,000

Much of the recent export inquiry has centered on cylinder oils, movement of which has continued fairly heavy notwithstanding advancing prices. Foreign buyers, it is reported, have permitted their stocks of lub oils to dwindle to virtually the vanishing point, and current buying is mainly for immediately requirements, indicating a continued good call for this oil over the next few months.

Imports

Imports of crude and refined petroleum at the principal United States ports for the week ended May 28 totaled 1,740,000 bbls., a daily average of 248,571 bbls., compared with 1,712,000 bbls., a daily average of 244,571 bbls. for the previous week, and a daily average of 255,786 bbls. for the four weeks ended May 28. Details follow:

	Bbls. of 42 gals.
At Atlantic Coast Ports—	
Baltimore	114,000
New York	1,364,000
Philadelphia	197,000
Total	1,675,000
Daily average	239,286
At Gulf Coast Ports—	
Port Arthur and Sabine district	65,000
Total	65,000
Daily average	9,286
At all United States Ports—	
Total	1,740,000
Daily average	248,571
Daily average four weeks	255,786

Distribution of total imports is as follows:

Crude	958,000
Gasoline	414,000
Fuel oil	368,000

California Oil Receipts

Receipts of California crude and refined petroleum at Atlantic and Gulf Coast ports for the week ended May 28 totaled 283,000 bbls., a daily average of 40,429 bbls., compared with 393,000 bbls., a daily average of 56,143 bbls. for the previous week and a daily average of 32,679 bbls. for the four weeks ended May 28. Details follow:

	Bbls. of 42 gals.
At Atlantic Coast Ports—	
New York	50,000
Philadelphia	233,000
Total	283,000
Daily average	40,429
At Gulf Coast Ports—	
All ports	None
At Atlantic and Gulf Coast Ports—	
Total	283,000
Daily average	40,429
Daily average four weeks	32,679

There were only two cargoes of gasoline reported cleared from the Pacific Coast for the Atlantic Seaboard, as follows:

For Philadelphia, 117,000 bbls. of gasoline on the Mercury Sun (Sun Oil Co.).

For New York, 113,000 bbls. of gasoline on the Daylight.

Thus far, neither receipts at Atlantic ports nor reported shipments from California have borne out predictions recently made in some market circles that California refiners had inaugurated a heavy "dumping" movement of gasoline, with the East Coast markets as their objective.

REFINERY AND CRUDE PRICES

Quotations on refined products are for interstate or export movement unless otherwise noted.

GASOLINES

	June 7		May 31	
OKLAHOMA (Group 3)—				
*U. S. Motor	.04½	.04⅝	.04¼	.04¾
60-62 400	.04⅝	.05	.04⅝	.04¾
64-66 390	.04¾	.05¼	.04½	.05
64-66 375	.04⅞	.05⅛	.04⅝	.05
68-70 350	.05	.05⅛	.04¾	.05¼
NORTH TEXAS—				
*U. S. Motor	.04⅜	.04⅝	.04¼	.04½
60-62 400	.04½	.04⅝	.04¼	.04⅜
64-66 390	.04⅝	.04⅞	.04⅜	.04¾
64-66 375	.04¾	.05	.04½	.05
64-66 360	.04⅞	.05⅛	.04⅝	.05¼
†NORTH LOUISIANA—				
*U. S. Motor	.05		.04⅞	
60-62 400	.05⅛		.05	
†ARKANSAS—				
*U. S. Motor	.05		.04⅞	
CHICAGO Based on Okla. (Group 3)—				
*U. S. Motor	.04⅝	.04¾	.04¼	.04⅝
60-62 400	.04½	.04¾	.04⅜	.04½
64-66 375	.04¾	.05	.04⅝	.04¾
Aviation fighting grade	.05⅞	.07½	.05⅞	.07½
68-70 360	.04⅞	.05⅛	.04¾	.04⅞

Octane Ratings—Above quotations cover price ranges on gasoline in which no octane rating is given. Week of June 7, in the case of the U. S. Motor and 60-62 400 endpoint grades where an octane rating of 57-65, inclusive, is guaranteed, prices are three-eighths cent per gallon higher than quotations shown in above tables; where an octane rating of better than 65 is guaranteed, the prices are five-eighths cent higher. In the case of the remaining grades, gasolines of 65 octane rating or higher are quoted one-half cent higher than the quotations shown in above tables.

Unless otherwise provided by agreement of buyers and sellers, the Series 30 testing equipment of the Ethyl Gasoline Corp. is recognized as standard in determining octane ratings.

*Present distillation specifications on U. S. Motor gasoline are: 10 per cent evaporated, 167° F. maximum; 50 per cent, 284° F. maximum; 90 per cent, 392° F. maximum; residue not exceeding 2 per cent; maximum vapor pressure, 12 pounds. Additional specification on U. S. Motor gasoline available from bulletins of Bureau of Mines, Washington, D. C.

†For Arkansas, Louisiana and Mississippi delivery.

PENNSYLVANIA (Inland refineries)—				
U. S. Motor	.06½	.06¾	.06½	.06¾
60-62 400	.06⅝	.06¾	.06⅝	.06¾
64-66 375	.06¾	.07	.06¾	.06⅞
68-70 350	.06⅞	.07	.06⅞	.07

Octane Ratings—In the case of U. S. Motor and 60-62 400 endpoint grades, same price differentials based on octane ratings as shown in above tables for Oklahoma and other Mid-Continent areas.

CALIFORNIA (domestic movement only)—				
54-58 U. S. Motor	.04¼	.04¾	.04¾	.05½
58-60 400	.06	.06½	.06	.06½
EAST COAST—				
U. S. Motor, below 65 octane:				
New York (Bayonne)	.06¾		.06¾	
Boston	.06¾	.07	.06¾	.07
Baltimore, Md.	.06¾	.07	.06¾	.07
Charleston, S. C.	.06¾		.06¾	
U. S. Motor, 65 octane and above:				
New York (Bayonne)	.07	.07¼	.07	.07¼
Boston	.07	.07¼	.07¼	
Baltimore, Md.	.07	.07¼	.07	.07¼
Charleston, S. C.	.07	.07¼	.07	.07¼
GULF COAST (domestic)—				
U. S. Motor, 65 octane and above	.06½	.06¾	.05½	.05¾
U. S. Motor, below 65 octane number	.05¼	.05½	.05¼	.05½

NAPHTHAS

	June 7		May 31	
OKLAHOMA (Group 3)—				
50-52 450 (blending)	.04¼	.04⅜	.04¼	.04½
PENNSYLVANIA (Inland refineries)—				
50-54 430-450 (blending)	.05⅞	.06¼	.05⅞	.06¼
ARKANSAS—				
48-50 450 (blending)	.05	.05⅛	.04¾	.05
CHICAGO Based on Okla. (Group 3)—				
50-52 450 (blending)	.04½	.04¾	.04⅜	.04⅝
Cleaners' naphtha, 56-58 gr. 200 i.b.p.-320 e.p.	.06¼	.06½	.06	.06¼
Lacquer diluent, 180 i.b.p.-250 e.p.	.08¾	.09	.07¾	.08¼
Lacquer diluent, 140 i.b.p.-200 e.p.	.08¼	.08½	.08¼	.08½
Rubber solvent, 68-70 gr., 100 i.b.p.-300 e.p.	.05¾	.06¼	.05¾	.06¼
Stoddard solvent, 300 i.b.p.-410 e.p. over 100° flash	.05¼	.05½	.05¼	.05½
Pet. thinner, 290, 300 i.b.p.-415 e.p., over 83° flash	.04¾	.05	.04¾	.05
V.M.&P. naphtha, 56-58 gr., 190-200 i.b.p.-330 e.p.	.05¼	.06	.05¼	.06
Petroleum spirits	.03⅞	.05	.03⅞	.05

NATURAL GASOLINES

	June 7		May 31	
OKLAHOMA (Group 3)—				
Grade 18-55	.02¼	.02⅜	.02¼	.02⅜
Grade 26-70	.01⅜	.01⅞	.01⅜	.01⅞
Grade 30-70	.01⅞		.01⅞	
NORTH TEXAS—				
Grade 18-55	.02¼		.02¼	
Grade 26-70	.01⅜		.01⅜	
Grade 30-70	.01⅞	.01¾	.01⅝	.01⅞
NORTH LOUISIANA—				
Grade 26-70	.02¼		.02¼	
CALIFORNIA—				
75-78 375	.04½	.05	.04½	.05

Note—Grades 18-55, 26-70 and 30-70 are three of 24 grades adopted by the Natural Gasoline Association of America effective January 1. The grades are based on pounds vapor pressure and amount evaporated at 140° F. While not exactly the same specifications apply, Grade 18-55 corresponds to the former Grade A, Grade 26-70 to former Grade AA and Grade 30-70 to former Grade BB.

KEROSENES

(All kerosenes water white)

	June 7		May 31	
OKLAHOMA (Group 3)—				
41-43	.03¼	.03⅜	.03½	.03¾
42-44	.03½	.04	.03⅝	.04
NORTH TEXAS—				
40-41	.03¼	.03½	.03⅜	.03½
41-43	.03⅜	.03½	.03½	
†NORTH LOUISIANA—				
41-43	.03¾	.03⅞	.04	.04¼
42-44	.03⅞	.04	.04¼	.04½
†ARKANSAS—				
41-43	.03¾	.03⅞	.04¼	
PENNSYLVANIA (Inland refineries)—				
45	.05	.05⅛	.05	.05⅛
46	.05	.05¼	.05	.05½
47	.05¼	.05½	.05¼	.05½
CHICAGO (Based on Group 3)—				
41-43	.03½	.03¾	.03⅝	.03⅞
42-44	.03⅝	.03⅞	.03¾	.04
***CALIFORNIA—**				
38-40 high burning test	.04	.04¾	.04	.04¾
NEW YORK (Bayonne, N. J.)—				
41-43	.05½	.06	.05½	.06
GULF COAST (domestic)—				
41-43 water white	.04¼	.04½	.04¼	.04½

*For Pacific Coast consumption.

†For Arkansas, Louisiana and Mississippi delivery.

TRACTOR FUELS*

	June 7		May 31	
OKLAHOMA (Group 3)—				
39-40 prime white	.02¾	.02½	.02⅝	.02½
38-40 light straw	.02⅛	.02¼	.02⅛	.02¼
NORTH TEXAS—				
38-40 light straw	.02⅛	.02¼	.02⅛	.02¼
CHICAGO (Based on Group 3)—				
38-40 light straw	.02½	.02⅝	.02⅛	.02⅜
PENNSYLVANIA (Inland refineries)—				
41-43 prime white	.04	.04¼	.04	.04¼

*There are no standard specifications for tractor fuels. Grades commonly sold have flash under 175° F. (open cup) and under 575° F. endpoint and less than .2 per cent sulphur. Tractor fuels are available from all Mid-Continent refining groups at prices in line with the Oklahoma market taking into consideration differentials in freight rates.

FURNACE OILS*

	June 7		May 31	
OKLAHOMA (Group 3)—				
32-36 straw	.01¾	.01⅞	.01¾	.01⅞
36-38 straw	.01¾	.02	.01¾	.02
38-40 straw	.01⅞	.02¼	.01⅞	.02¼
39-41 prime white	.02¼	.02½	.02¼	.02½
NORTH TEXAS—				
38-40 straw	.01⅞	.02	.01⅞	.02
†NORTH LOUISIANA—				
36-40	.02¼	.02½	.02⅜	.02½
†ARKANSAS—				
32-36	.02¼	.02½	.02⅜	.02½
CHICAGO (Based on Group 3)—				
32-36 straw	.01¾	.01⅞	.01¾	.01⅞
58-40 straw	.02	.02⅛	.02	.02⅛
PENNSYLVANIA (Inland refineries)—				
40-41 prime white	.03½	.03¾	.03½	.03¾
NEW YORK (Bayonne, N. J.)—				
32-36	.04	.04½	.04	.04½
36-40	.05	.05½	.05	.05½

*Above prices are for furnace oils of zero cold test under 190° F. flash and good odor.

†For Arkansas, Louisiana and Mississippi delivery.

GAS OIL, DIESEL OIL AND FUEL OIL

Gas oil (G.O.) quoted per gallon basis; Diesel oil and fuel oil per barrel.

	June 7		May 31	
OKLAHOMA (Group 3)—				
32-36 (G.O.) cracking stock	.01⅜	.01½	.01⅜	.01½
U.G.I. (G.O.)	.01⅜	.01½	.01⅜	.01½
32-36, zero to 15 (G.O.) high flash	.01½	.01⅝	.01½	.01⅝
28-30, zero to 10	.50	.55	.50	.55
26-30, zero to 10	.50		.50	
24-26	.42½	.45	.42½	.45
20-22	.40	.45	.40	.45
16-20	.35	.40	.35	.40
Below 16	.32½	.35	.32½	.35
NORTH TEXAS—				
32-36 (G.O.) industrial	.01¼	.01⅜	.01¼	.01⅜
22-26	.45	.50	.45	.50
Below 20	.35	.45	.35	.45
†NORTH LOUISIANA—				
32-36 (G.O.) zero	.02		.02¼	.02½
14-16	.35	.40	.35	.40
†ARKANSAS—				
32-36 (G.O.) zero	.02		.02¼	.02½
14-16	.35	.40	.35	.40
CHICAGO (Based on Group 3)—				
32-36 (G.O.) industrial	.01⅜		.01⅜	
28-30 (zero)	.55	.60	.55	.60
22-26	.40	.45	.40	.45
18-22	.25	.30	.25	.30
Below 18	.22½	.27½	.22½	.27½
PENNSYLVANIA (Inland refineries)—				
36-40	.03¼	.03½	.03¼	.03½

Note—Fuel oils of more than 40 cold test generally 5 to 10 cents per barrel less in all areas than shown in above tables.

†For Arkansas, Louisiana and Mississippi delivery.

CALIFORNIA—				
30-34 (G.O.) per bbl.	.65	.85	.65	.85
27 plus Diesel	.70	.85	.70	.85
15-19 Bunker (at tidewater)	.55	.75	.55	.75
15-19 Bunker (cargo lots)	.50	.65	.50	.65
15-19 (tank cars)	.45	.65	.45	.65
GULF COAST—				
28-30 (G.O.)	.03	.03⅛	.03	.03⅛
28-30 Diesel	1.35		1.35	
Bunker C (bulk cargoes)	.50	.55	.50	.55
Bunker C (bunkers)	.60		.60	
NEW YORK (Bayonne, N. J.)—				
28 plus (G.O.)	.04		.04	
*28-30 Diesel	1.50		1.40	
†Bunker C	.75		.75	

*Lighterage 6½ cents per barrel.

†Lighterage 5 cents per barrel.

PETROLEUM COKE*

Prices per ton f.o.b. refineries in Chicago area.

	June 7		May 31	
Breeze (screenings)	3.50	3.75	3.50	3.75
Still runs	4.50	4.75	4.50	4.75
Lump and egg	5.00	5.50	5.00	5.50

*Refiners will absorb freight up to 80 cents a ton.

NEUTRAL OILS

(Viscosity at 100° F. and Color)

	June 7		May 31	
OKLAHOMA (Group 3)—				
Zero to 10 Cold Test:				
150-3	.06¼	.06½	.06¼	.06½
180-3	.07½	.07⅝	.07½	.07⅝
180-4	.07	.07¼	.07	.07¼
200-3	.08¼	.08½	.08¼	.08½
200-4	.08	.08¼	.08	.08¼
240-3	.09¾	.10	.09¾	.10
240-4	.09	.09½	.09	.09½
280-3	.11¼	.11½	.11¼	.11½
280-4	.10¼	.10½	.10¼	.10½
300-3.5	.11¾	.12	.11¾	.12
350-3.5	.12¼	.12½	.12¼	.12½
400-4	.12¾	.13	.12¾	.13
500-4-5	.13¼	.13½	.13¼	.13½
100-2 Paraffin Oil	.04¼	.04½	.04¼	.04½
15-30 Cold Test:				
200-3	.07¾	.08	.07¾	.08
200-4	.07½	.07¾	.07½	.07¾
240-3	.09¼	.09½	.09¼	.09½
240-4	.08¾	.09	.08¾	.09
280-3	.10¾	.11	.10¾	.11
280-4	.09¾	.10	.09¾	.10
PENNSYLVANIA—				
150-vis., No. 3, 400-405:				
Zero pour test	.15	.16	.15	.16
10 pour test	.14	.15	.14	.15
15 pour test	.13½	.14½	.13½	.14½
25 pour test	.12¾	.13¼	.12¾	.13¼
30 pour test	.12¾	.13	.12¾	.13
180 vis., No. 3, 25 pour test	.15¾	.16½	.15¾	.16½
200 vis., No. 3:				
Zero pour test	.22	.23½	.22	.23½
10 pour test	.21	.22	.21	.22
15 pour test	.19½	.20	.19½	.20
25 pour test	.18	.18½	.18	.18½
30 pour test	.17¾	.18	.17¾	.18
GULF COAST—				
Pale Oils:				
100-2-2½	.05		.05	
200-3	.06½		.06½	
300-3	.07		.07	
500-3½	.08	.08½	.08	.08½
750-3½	.09	.09½	.09	.09½
1,200-3½	.10½	.11	.10½	.11
2,000-4	.12	.12½	.12	.12½
Red Oils:				
200-5-6	.05	.05½	.05	.05½
300-5-6	.05½	.06	.05½	.06
500-5-6	.06¾	.07	.06¾	.07
1,200-5-6	.09½	.10	.09½	.10
2,000-6 plus	.11	.11½	.11	.11½

REFINERY AND CRUDE PRICES

Quotations on refined products are for interstate or export movement unless otherwise noted.

CALIFORNIA—				
Pale Oils:				
100-2½-3	.07¾	.08	.07¾	.08
200-2½-3	.07¾	.08	.07¾	.08
300-3-3½	.08¼	.08½	.08¼	.08½
350-3-4	.08¾	.09	.08¾	.09
400-3-4	.09¼	.09¾	.09¼	.09¾
450-3-4	.09¾	.10	.09¾	.10
550-3-4	.10¼	.11	.10¼	.11
Red Oils:				
200-4½-5	.07	.07¼	.07	.07¼
300-5-6	.07½	.07¾	.07½	.07¾
350-5-6	.07¾	.08	.07¾	.08
400-5-6	.08		.08	
450-5-6	.08	.08¼	.08	.08¼
500-5-6	.08¼	.08½	.08¼	.08½
600-5-6½	.08¾	.09	.08¾	.09
700-6½ plus	.09		.09	
750-6½ plus	.09	.09½	.09	.09½
900-6½ plus	.13½	.14	.13½	.14
NEW YORK (Bayonne, N. J.)—				
Paraffin Oil:				
25 pale	.10¼		.10¼	
2 pale	.07¼		.07¼	
280 red	.12½		.12½	
250 red	.11½		.11½	
225 red	.10		.10	
200 red	.09¼		.09¼	

BRIGHT STOCKS AND STEAM REFINED STOCKS

OKLAHOMA (Group 3)—	June 7		May 31	
600 light green S.R.	.05	.06	.05	.06
600 dark green S.R.	.04	.04½	.04	.04½

Bright Stock:				
190-200 D	.22	.23	.22	.23
150-160 D, 0-10	.21		.20¾	.21
150-160 D, 10-25	.20½		.20¼	.20½
150-160 D, 25-40	.20		.19¾	.20
150-160 E	.20		.20	
PENNSYLVANIA—				
600 S.R.	.14	.15	.14	.15
650 S.R.	.16½	.17	.16½	.17
600 Pennsylvania flash	.17½	.18	.17½	.18
600 D filtered	.22½	.23	.22½	.23
600 E filtered	.17	.17½	.17	.17½
Pennsylvania Grade bright stock:				
Bright Stock, No. 8 color, 145-50 vis., 210-540-550 flash:				
10 pour test	.27½	.28½	.27½	.28½
15 pour test	.25	.26	.25	.26
25 pour test	.24	.24½	.24	.24½
35 pour test	.23½	.24	.23½	.24

WAX AND PETROLATUM

(Prices per pound)

OKLAHOMA (Group 3)—	June 7		May 31	
124-126 white crude scale	.01⅝	.01¾	.01⅝	.01¾
PENNSYLVANIA—				
122-124	.02		.02	
124-126	.02	.02¼	.02	.02¼
NEW YORK (Bayonne, N. J.)—				
Refined Wax:				
120-122	.02½		.02½	
125-127	.03		.03	
130-132	.03⅜		.03⅜	
133-135	.04		.04	
135-137	.04⅛		.04⅛	
Petrolatum in barrels in carload lots:				
Dark Green	.01¾		.01¾	
Amber	.02⅛		.02⅛	
Extra amber	.02⅝		.02⅝	
Cream	.04⅝		.04⅝	
Lily white	.05⅝		.05⅝	
Snow white	.06⅝		.06⅝	

EXPORT PRICES

GASOLINE

GULF COAST—	June 7		May 31	
U. S. Motor	.04½		.04½	
60-62 400	.04⅝		.04⅝	
61-63 390	.04¾		.04¾	
64-66 375	.05		.05	
LOS ANGELES, CALIF.—				
U. S. Motor, 53-55 437 e.p.	.03¾	.04¼	.03¾	.04¼
U. S. Motor, 65 octane num.	.05		.05	
U. S. Motor, 67 octane num.	.05¼		.05¼	
U. S. Motor, 69 octane num.	.05½		.05½	
58-62 400 endpoint gasoline	.04¼	.05	.04¼	.05

KEROSENE

GULF COAST—				
41-43 prime white	.04⅜		.04⅜	
41 water white	.04½		.04½	
LOS ANGELES, CALIF.—				
41-43 water white	.03¾	.04¾	.03¾	.04¾

LUBRICANTS

NEW YORK (Bayonne, N. J.)—				
600, steam refined cylinder stocks, in bbls.	.21½	.22	.21½	.22
650, steam refined	.24½	.25	.24½	.25
600, Pennsylvania flash	.25	.26	.25	.26
630, Pennsylvania flash	.30½	.31	.30½	.31
600, Warren E	.24	.25	.24	.25
600, Oil City E	.23	.24	.23	.24
Light 140-150 Bright Stocks	.31	.32	.31	.32
Dark 140-150 Bright Stocks	.29½	.30½	.29½	.30½

CRUDE OIL PRICES

OKLAHOMA, KANSAS, NORTH AND EAST CENTRAL TEXAS

East Texas (Apr. 1, 1932)†.....$ .93
East Texas (April 11, 1932)‡.....93
Corsicana heavy*.....64
Other fields.....See gravity table

†Posted by Magnolia Petroleum Co., Sinclair Refining Co., Panola Pipe Line Co., Tidal Refining Co. and The Texas Company. ‡Gulf Pipe Line Co. and Atlas Pipe Line Co. *Magnolia Petroleum Co.

EASTERN STATES

Joseph Seep Purchasing Agency
(Effective April 25, 1932)

Pennsylvania Grade Oil in National Transit Lines (Bradford Field) (Mar. 14, 1932).....$2.02
Pennsylvania Grade Oil in Southwest Pennsylvania Lines.....1.75
Peana Grade Oil in Eureka Pipe Line Lines (West Virginia) (Feb. 26, 1932) 1.70
Peana Grade Oil in Buckeye Pipe Line Lines (Mar. 12, 1932).....1.55
Corning Grade Oil in Buckeye Pipe Line Co.'s line (April 26, 1932).....1.05
Ragland Grade Oil in Cumberland Pipe Lines (Kentucky) (Jan. 10, 1931) ... .60

Pennzoil Co.
(Effective April 25, 1932)

Pennsylvania Grade Oil in National Transit Lines:
Group A.....$1.97
Includes Cochran, Franklin, Hamilton and Deolittle districts.
Group B.....1.96
Includes Titusville district.
Group C.....1.95
Includes Turkey and Tidiout districts.
Group D.....1.94
Includes Bear Creek and Porkey districts.
Group E.....1.93
Includes Eidenau, Bull Creek, Rough Run, Carbon, Dipner, Bredin, McJunkin, Jameson, Kennerdell, Emlenton, Tiona, Lacy and Kinzua districts.
Price depends on length of pipe line haul to plant at Oil City.

Tide Water Pipe Co.
(Effective April 25, 1932)

Bradford, Pa.....$2.02
Allegany, N. Y.....2.02

Pure Oil Co.
(Effective April 25, 1932)

Cabin Creek, W. Va.....$1.70
Bradford Hollow, W. Va.....1.70
Kelly's Creek, W. Va.....1.70

TEXAS PANHANDLE

Gray County, Wheeler County and Carson-Hutchinson Counties.....See gravity table

ROCKY MOUNTAIN STATES

Ohio Oil Co.-Midwest Refining Co.

Ilsa, light (Aug. 24, 1931).....$ .75
Ilsa, heavy (Aug. 24, 1931).....53
Fort Collins (April 11, 1932).....86
Florence (April 11, 1932).....80
Wellington (April 11, 1932).....76
Greasewood Dome, Colo. (Apr. 11, 1932) 1.00
Dutton Creek (April 11, 1932).....82
Rock Creek, Wyo. (April 11, 1932) 1.00
Frannie, light (Nov. 3, 1931).....61
Frannie, heavy (Nov. 3, 1931).....51
Salt Creek.....Mid-Continent gravity table
LaBarge.....Mid-Continent gravity scale
Big Muddy (April 11, 1932).....98
Grass Creek (April 11, 1932).....1.30
Elk Basin (April 11, 1932).....1.30
Lance Creek (April 11, 1932).....1.15
Poison Spider (Mar. 5, 1931).....70
Notches (Mar. 14, 1927).....65
Hudson (June 3, 1931).....65
Lander (Mar. 5, 1931).....40
Rex Lake (Feb. 22, 1930).....1.10
Osage (Apr. 15, 1931).....98
Lost Soldier (April 13, 1932).....80
Hamilton Dome (Nov. 3, 1931).....45
Greybull (April 11, 1932).....1.20
Cat Creek (April 11, 1932).....1.20
Pondera (Nov. 3, 1931).....90
Sunburst, Mont. (April 11, 1932).....1.05
Hogback, N. Mex. (Aug. 24, 1931).....80
Border, Mont.....1.55
Red Coulee, Alberta.....1.55
Lea County, N. Mex. (Apr. 1, 1932)*..45
Maljamar (April 11, 1932).....60
Artesia-Jackson (April 11, 1932).....65

Note—Salt Creek, Cat Creek, Dry Creek, Dallas-Derby, Hudson, Greybull, Hogback and Iles by Midwest Refining Co. and remainder by Ohio Oil Co. Both companies posted Grass Creek light and Elk Basin. Lost Soldier posted by Producers & Refiners Corp. Artesia, Jackson and Maljamar posted by Continental Oil Co. Border and Red Coulee posted by Imperial Refining Co. Lea County posted by Humble Oil & Refining Co. Fort Collins, Wellington, Orchard, Florence, Rattlesnake and Table Mesa by Continental Oil Co. Osage posted by Arro Oil & Refining Co.

*Posted by The Texas Company. Humble Oil & Refining Co. met this price effective April 11.

WEST TEXAS

Iatan and Westbrook..Same as North Texas
Crane, Upton, Crockett, Howard, Glasscock, Mitchell, Ector, Winkler and Pecos Counties*.....$ .65
Lea County, N. Mex. (See Rocky Mountain States).
Toborg, Pecos County (April 11, 1932)† .55

*Effective April 1, 1932, Magnolia Petroleum Co., The Texas Company. Effective April 11, Humble Oil & Refining Co. and Gulf Pipe Line Co. and Stanolind Oil & Gas Co. in Winkler County. †Shell Petroleum Corp.

GULF COAST

Grade A and Grade B classifications discontinued by leading buyers.....See gravity table
Jennings, La. (April 11, 1932)*.....$ .75
Lockport, La...See Gulf Coast gravity table
Refugio, light.....See gravity table
Refugio, heavy (April 11, 1932)‡ ..... .80
Markham (April 11, 1932)‡.....See Gulf Coast gravity schedule
High Island (April 11, 1932)‡.....See Gulf Coast gravity schedule

*Gulf Refining Co. †Magnolia Petroleum Co. ‡Humble Oil & Refining Co. §The Texas Company. ¶Yount Lee Pipe Line Co.

NORTH LOUISIANA AND ARKANSAS

Smackover, Ark. (all grades) .....$ .65
Urania, La. (April 12, 1932) ..... .60
East El Dorado, Ark. (April 6, 1932).. .65
Stephens, Ark., below 29° (April 12, 1932) ..... .61
Stephens, Ark., 29° and above (April 12, 1932) ..... .64
Other fields.....See gravity table

Note—Smackover, all grades, The Texas Company, April 1, 1932; Magnolia Petroleum Co., April 6, 1932; Standard Oil Co. of Loui-

(Continued on Next Page)

CRUDE OIL GRAVITY TABLE

	Kansas and Oklahoma	North and Central Texas	East Central Texas	Gray County, Texas	Carson and Hutchinson Counties, Texas	Salt Creek and LaBarge, Wyoming	North Louisiana and Arkansas	Gulf Coast (Texas-Louisiana)	Cameron Meadows, Louisiana	Iowa and Lockport, Louisiana
	1	2	3	4	5	6	7	8	9	10
Below 25 degrees	....	....	$.67	....	....	....	$.68	$.80	$.70	$.80
25-25.9 degrees	....	....	.67	....	....	....	.70	.81	.71	.81
26-26.9 degrees	....	....	.67	....	....	....	.72	.82	.72	.82
27-27.9 degrees	....	....	.67	....	....	....	.74	.83	.72	.83
28-28.9 degrees	....	....	.76	....	....	....	.76	.84	.74	.84
Below 29 degrees	$.76	$.76	....	....	....	$.76	....	....	....	....
29-29.9 degrees	.78	.78	.78	....	....	.78	.78	.85	.75	.85
30-30.9 degrees	.80	.80	.80	....	....	.80	.80	.86	.76	.86
31-31.9 degrees	.82	.82	.82	....	....	.82	.82	.87	.77	.87
32-32.9 degrees	.84	.84	.84	....	....	.84	.84	.88	.78	.88
33-33.9 degrees	.86	.86	.86	....	....	.86	.86	.89	.79	.89
34-34.9 degrees	.88	.88	.88	$.74	$.66	.88	.88	.90	.80	.90
35-35.9 degrees	.90	.90	.90	.78	.68	.90	.90	.91	.81	.91
36-36.9 degrees	.92	.92	.92	.80	.70	.92	.92	.92	.82	.92
37-37.9 degrees	.94	.94	.94	.82	.72	.94	.94	.94	.84	.94
38-38.9 degrees	.96	.96	.96	.84	.74	.94	.96	.96	.86	.96
39-39.9 degrees	.98	.98	.98	.86	.76	.94	.98	.98	.88	.98
40 degrees and over.	1.00	1.00	1.00	.88	.78	.94	1.00	1.00	.90	1.00

Note—Magnolia Petroleum Co.'s prices in Oklahoma, North Texas and Central Texas, effective April 1, are the same as above given in Columns 1 and 2, excepting that the schedule begins with below 28 degrees, 67 cents; 28-28.9 degrees, 76 cents. The Empire Pipe Line Co. met the Magnolia prices in Kansas and Oklahoma; the White Eagle Oil Corp. in Kansas and the Pure Oil Co., in Oklahoma.

Column 1—Effective April 1, 1932, Continental Oil Co. in Oklahoma and Kansas; Barnsdall Refineries, Inc., and Standish Oil Co. (Phillips Petroleum Co.), in Oklahoma and Kansas; Skelly Oil Co., Kanotex Refining Co., Derby Oil Co., Vickers Petroleum Co., in Kansas; Magnolia Petroleum Co. and Pure Oil Co., in Oklahoma (see note above); White Eagle Oil Corp., in Kansas (see note above); The Texas Company in Oklahoma. Effective April 11, 1932, Stanolind Crude Oil Purchasing Co. in Oklahoma and Kansas; Gypsy Oil Co., Mid-Continent Petroleum Corp., Champlin Refining Co., Eason Oil Co., Pepper Gasoline Co. and Carter Oil Co. in Oklahoma. Carter Oil Co.'s schedule begins at below 25 degrees, 68 cents, with 2 cents added for each degree upward.

Column 2—Continental Oil Co., effective April 1, in North Texas only; followed on same day by The Texas Company in North and Central Texas; Magnolia Petroleum Co. in North and Central Texas (see note above); effective April 11, the Humble Oil & Refining Co., Gulf Pipe Line Co. and Stanolind Crude Oil Purchasing Co.

Column 3—Effective April 1, 1932, the Magnolia Petroleum Co.; effective April 11, 1932, Humble Oil & Refining Co.

Column 4—Effective April 1, 1932, Magnolia Petroleum Co.; effective April 2, the Philtex Oil Co. (Phillips Petroleum Co.), but its schedule was carried down to below 30 degrees at 66 cents, with 2 cents added for each degree upward. Effective April 11, other companies met Continental schedule.

Column 5—Effective April 1, 1932, Magnolia Petroleum Co.; effective April 2, Philtex Oil Co., excepting that latter company carried its schedule down to below 30 degrees at 56 cents, with 2 cents added for each degree upward. Effective April 11, Continental Oil Co. and Gulf Pipe Line Co. met Magnolia Petroleum Co. prices.

Column 6—Midwest Refining Co., effective April 11, 1932.

Column 7—The Texas Company, effective April 1, 1932; Magnolia Petroleum Co., effective April 6, 1932; Standard Oil Co. of Louisiana, Louisiana Oil Refining Co., Stanolind Oil & Gas Co. (in Pine Island and Pleasant Hill and in Marion County, Texas) and Gulf Refining Co., effective April 11, 1932.

Column 8—The Texas Company, effective April 1, 1932; Sun Oil Co., April 1, 1932; Humble Oil & Refining Co., effective April 11, 1932; Gulf Pipe Line Co., effective April 11, 1932. Gulf's gravity scale ends with a top of 35 and above at 91 cents.

Column 9—Magnolia Petroleum Co., effective April 6, 1932.

Column 10—Magnolia Petroleum Co., effective April 6, 1932.

(California Crude Oil Prices on Page 47)

TANK WAGON MARKETS

Tank wagon quotations for gasoline and kerosene in United States as furnished by the larger marketing concerns June 7.

ALL TANK WAGON AND SERVICE STATION QUOTATIONS INCLUDE TAXES

STANDARD OIL CO. (INDIANA)

	Gasoline: Tank wagon	Gasoline: Service station	Incl'ds tax of	Kero. tank wagon
Chicago	16.0	16.0	3.0	10.9
Decatur, Ill.	16.5	16.5	3.0	10.1
E. St. Louis	15.8	15.8	3.0	9.9
Joliet	16.5	16.5	3.0	10.1
Peoria	16.5	16.5	3.0	10.1
Quincy	16.3	16.3	3.0	9.9
Davenport, Ia.	16.6	16.6	3.0	10.4
Des Moines	16.6	16.6	3.0	10.4
Keokuk	16.6	16.6	3.0	10.4
Sioux City	16.2	16.2	3.0	10.0
Duluth, Minn.	17.6	17.6	3.0	11.0
Mankato	17.2	17.2	3.0	9.7
Minneapolis	17.3	17.3	3.0	11.0
LaCrosse, Wis.	18.3	18.3	4.0	11.1
Milwaukee	17.2	17.2	4.0	10.0
Madison	17.4	17.4	4.0	10.2
Detroit, Mich.	13.5	13.5	3.0	10.8
Grand Rapids	16.6	16.6	3.0	10.5
Saginaw	15.5	15.5	3.0	10.8
Evansville, Ind.	17.3	17.3	4.0	10.1
Indianapolis	17.3	17.3	4.0	10.1
South Bend	17.8	17.8	4.0	10.6
Fargo, N. D.	19.0	19.0	3.0	13.9
Huron, S. D.	18.4	18.4	4.0	11.5
Sioux Falls	17.9	17.9	4.0	11.5
K. C., Mo.	16.0	16.0	3.0	8.7
Springfield*	16.0	16.0	3.0	9.6
St. Louis*	15.5	15.5	3.0	9.4
St. Joseph	15.6	15.6	3.0	9.2
Wichita, Kans.	14.9	14.9	3.0	8.9
Bartlesville, Ok.	14.1	17.0	4.0	8.1

*State tax 2 cents, remainder city tax.

A third grade of gasoline, "Stanolind Blue," is sold at all major points at a price 1½ cents or more below the price on the regular grade.

Effective November 4—New dump discount applicable on all grades of gasoline sold from tank wagon. Any tank wagon customer buying 25 gallons or more at one time will be given 1-cent discount per gallon off tank wagon price at time of delivery. Customers not under contract receive no other discount.

Effective January 1—Discounts on Q.D.A. on 500 gallons or more per month throughout territory; Red Crown Ethyl Gasoline, 3 cents off tank wagon price; Red Crown gasoline, 2½ cents off tank wagon price; Stanolind Blue gasoline, 1 cent off tank wagon price. On deliveries of 75,000 gallons or more each classification allowed 1 cent additional discount.

Discounts on resellers authorized agent's agreement: Same amounts as above except made off service station price instead of tank wagon price.

SOUTHWESTERN DISTRICT

Magnolia Petroleum Co.

	Gasoline: Tank wagon	Gasoline: Service station	Incl'ds tax of	Kero. tank wagon
Dallas, Tex.	16.5	16.0	4.0	10.0
Fort Worth	16.5	18.0	4.0	9.0
Houston	15.5	19.0	4.0	10.0
San Antonio	15.5	18.0	4.0	9.0
El Paso	15.5	18.0	4.0	12.0
Texarkana	*18.5	18.5	4.0	†11.0
Muskogee, Ok.	14.5	17.0	4.0	9.0
Okla. City	14.5	17.0	4.0	9.0
Tulsa	14.5	17.0	4.0	9.0
Ft. Smith, Ark.	*16.5	*16.5	5.5	†11.0
Little Rock	*19.0	*19.0	6.0	†11.0

One-cent rebate made from posted station prices to cash purchasers in Louisiana, Arkansas and Tennessee.

*Less 2½ cents to dealers. †Less 2 cents to dealers.

PENNSYLVANIA-DELAWARE AND PART OF NEW ENGLAND

Atlantic Refining Co.

	Gasoline: Tank wagon	Gasoline: Service station	Incl'ds tax of	Kero. tank wagon
Pittsburgh, Pa.	16.0	17.8	3.0	11.0
Philadelphia	15.0	16.0	3.0	11.0
Scranton	16.0	17.8	3.0	11.0
Allentown	16.0	17.8	3.0	11.0
Altoona	16.0	17.0	3.0	11.0
Erie	16.0	17.0	3.0	11.0
Dover, Del.	16.0	17.8	3.0	11.0
Wilmington	16.0	17.6	3.0	11.0
Springf'd, Mass.	16.5	17.5	3.0	8.0
Worcester	16.3	17.3	3.0	8.0
Boston	15.5	16.5	3.0	8.0
Providence, R.I.	13.5	14.5	3.0	9.0
Hartford, Conn.	15.5	16.5	3.0	8.0
New Haven	15.6	16.6	3.0	8.0

OHIO

Standard Oil Co. (Ohio)

	Gasoline: Tank wagon	Gasoline: Service station	Incl'ds tax of	Kero. tank wagon
Ohio points	17.5	18.0	4.0	*13.0

Dealers and commercial accounts 2 cents under tank wagon.

*Service station price 13 cents.

ROCKY MOUNTAIN DISTRICT

Continental Oil Co.

	Gasoline: Tank wagon	Gasoline: Service station	Incl'ds tax of	Kero. tank wagon
Denver, Colo.	17.8	20.8	4.0	13.5
Pueblo	17.0	20.0	4.0	13.0
Grand Jctn	19.0	22.0	4.0	15.5
Casper, Wyo.	16.0	19.0	4.0	11.0
Cheyenne	15.0	18.0	4.0	12.5
Butte, Mont.	22.0	25.0	5.0	17.0
Billings	22.0	25.0	5.0	15.5
Great Falls	22.0	25.0	5.0	17.0
Helena	21.0	24.0	5.0	17.0
Salt Lake, Utah	18.5	21.5	4.0	16.0
Albu'que, N. M.	17.0	20.0	6.0	14.0
Boise, Idaho	†18.0	20.0	5.0	18.0
Twin Falls	19.0	22.0	5.0	18.0

*Two-cent discount off tank wagon to dealers.

†One-cent discount to dealers at time of delivery.

SOUTHERN DISTRICT

Standard Oil Co. (Kentucky)

	Gasoline: Tank wagon	Gasoline: Service station	Incl'ds tax of	Kero. tank wagon
Atlanta, Ga.*	21.0	21.0	6.0	11.0
Augusta	20.5	20.5	6.0	14.5
Macon	21.0	21.0	6.0	13.0
Savannah	19.0	19.0	6.0	13.5
Birm'ham, Ala.	20.0	20.0	6.0	11.0
Mobile	20.5	20.5	6.0	10.0
Montgomery	22.5	22.5	6.0	14.5
Jackson, Miss.	19.0	19.0	6.0	12.5
Vicksburg	19.0	19.0	6.0	10.5
Jack'ville, Fla.	19.0	19.0	7.0	13.5
Miami	21.0	21.0	7.0	13.5
Pensacola	21.0	21.0	7.0	13.5
Tampa	20.0	20.0	7.0	9.5
Lexington, Ky.	17.5	18.5	5.0	10.5
Covington	18.0	19.0	5.0	10.5
Louisville	16.0	17.0	5.0	10.5
Paducah	17.5	18.5	5.0	8.5

A third grade "Kyso Green" is sold at a price generally 2 cents below the price on the regular grade.

In addition to the state tax of 4 cents on gasoline, Montgomery has city and county tax of 2 cents on gasoline and one-half cent on kerosene. Kerosene prices in Georgia include 1-cent tax. In Florida, an inspection fee of 0.125 cent; in Alabama, an inspection fee of one-half cent on kerosene and one-fourth cent on gasoline. To Pensacola, Montgomery and Birmingham state taxes add 1-cent tax. To Mobile state tax add 1-cent city tax and 2½ cents county tax.

Effective April 2 price to dealers 2 cents under posted tank wagon price.

*An additional discount of 1 cent is offered to dealers effective October 6.

ATLANTIC COAST DISTRICT

Standard Oil Co. (New Jersey)

	Gasoline: Tank wagon	Gasoline: Service station	Incl'ds tax of	Kero. tank wagon
Atl'tic City, N.J.	16.4	16.9	3.0	11.2
Newark	15.7	16.2	3.0	8.5
Annapolis, Md.	17.0	17.5	4.0	10.0
Baltimore	16.4	16.9	4.0	7.0
Cumberland	17.9	18.4	4.0	11.7
Wash'g'n, D. C.	14.9	15.4	3.0	10.0
Danville, Va.	19.1	19.6	5.0	11.9
Norfolk	17.5	18.0	5.0	10.3
Petersburg	18.6	19.1	5.0	11.4
Richmond	17.9	18.4	5.0	10.7
Roanoke	19.1	19.6	5.0	11.9
Charles'n, W.Va.	17.8	18.3	4.0	11.6
Parkersburg	16.4	16.9	4.0	10.2
Wheeling	17.4	17.9	4.0	11.2
Charlotte, N. C.	20.7	21.2	6.0	12.5
Hickory	20.9	21.4	6.0	12.7
Mt. Airy	21.0	21.5	6.0	12.8
Raleigh	20.5	21.0	6.0	12.3
Salisbury	20.8	21.3	6.0	12.6
Charleston, S. C.	18.5	19.0	6.0	10.3
Columbia	20.4	20.9	6.0	12.2
Spartanburg	20.7	21.2	6.0	12.5

Two and one-half cents per gallon discount off tank wagon price of gasoline to dealers except Washington, D. C., and States of Maryland and New Jersey, where discount is 3½ cents.

Prices shown above are for standard gasoline.

STANOLIND FURNACE OIL IN CHICAGO

Effective July 1, prices f.a.b. Chicago, tank wagon prices: 1 to 99 gallons, 8 cents; 100 gallons or more, 6 cents.

Stanolax Fuel

Effective May 9, f.o.b. Chicago, tank wagon prices: 1 to 199 gallons, 7 cents; 200 gallons or more, 5 cents. Sinclair met this by bringing down the price of its No. 3.

Fuel Oils

Chicago tank wagon prices (in lots of 400 gallons and over): 38-40 straw distillate, 6 cents; 32-36 gas oil (light sorc), 5.5 cents; 32-36 gas oil (industrial), 5.25 cents; 28-30 sorc fuel oil, 5 cents; 24-26 fuel oil, 4.25 cents; 18-22 fuel oil, 3.75 cents.

NEW YORK AND PART OF NEW ENGLAND DISTRICT

Standard Oil Co. (New York)

	Gasoline: Tank wagon	Gasoline: Service station	Incl'ds tax of	Kero. tank wagon
Albany, N. Y.	15.5	16.5	3.0	10.0
New York*	12.5	12.5	3.0	9.5
Buffalo	16.5	17.5	3.0	9.0
Rochester	16.5	17.5	3.0	9.0
Syracuse	17.2	18.2	3.0	9.5
Boston, Mass.	15.0	16.0	3.0	9.0
Augusta, Me.	17.3	18.3	4.0	9.5
Manch'tr, N. H.	16.9	17.9	4.0	9.0
Burlington, Vt.	17.8	18.8	4.0	10.0

*Prices in steel barrels.

PACIFIC COAST TERRITORY

Standard Oil Co. of California*

	Gasoline: Tank truck†	Gasoline: Posted retail	Incl'ds tax of	Kero. tank wagon
Fresno	16.5	14.5	3.0	17.0
San Francisco	16.5	14.5	3.0	15.5
Los Angeles	16.0	14.0	3.0	15.5
Reno, Nev.	20.0	20.0	4.0	19.0
Portland, Ore.	17.5	16.5	4.0	16.5
Seattle, Wash.	18.5	17.5	5.0	16.5
Tacoma	18.5	17.5	5.0	16.5
Spokane	22.0	21.0	5.0	20.5
Phoenix, Ariz.	15.5	17.0	5.0	20.0

†Above prices are at company's plant or depots as company does not operate stations. A 4-cent per gallon discount is given dealers and customers taking tank wagon lots except in Phoenix where the discount is 1 cent.

*Retail prices posted by Standard Stations, Inc., a subsidiary.

CENTRAL SOUTH DISTRICT

Standard Oil Co. (Louisiana)

	Gasoline: Tank wagon	Gasoline: Service station	Incl'ds tax of	Kero. tank wagon
N. Orleans, La.	19.0	19.0	6.0	†12.0
Baton Rouge	18.0	18.0	5.0	10.0
Alexandria	19.0	19.0	6.0	10.0
Lafayette*	19.0	19.0	6.0	†10.0
Lake Charles*	19.0	19.0	6.0	†12.0
Shreveport	18.0	18.0	5.0	†12.0
Knoxville, Tenn.	22.0	22.0	7.0	13.5
Memphis	20.5	20.5	7.0	11.0
Chattanooga	22.0	22.0	7.0	13.5
Nashville	21.5	21.5	7.0	13.0
Bristol	20.5	20.5	7.0	14.0
Lt. Rock, Ark.	19.0	19.0	6.0	11.0

*Includes city tax of 1 cent. Louisiana kerosene prices include 1-cent state tax. New Orleans kerosene price also includes 1-cent city tax.

†Kerosene prices in Louisiana include 1-cent tax except New Orleans where tax is 2 cents.

Two-cent discount off gasoline and kerosene tank wagon price to dealer and commercial accounts.

NEBRASKA

Standard Oil Co. (Nebraska)

	Gasoline: Tank wagon	Gasoline: Service station	Incl'ds tax of	Kero. tank wagon
Omaha	15.9	16.9	4.0	10.25
McCook	17.0	17.0	4.0	11.75
Norfolk	17.75	18.75	4.0	10.75
N. Platte	18.0	18.0	4.0	11.5
Scottsbluff	17.0	17.0	4.0	11.25

Note—Dealers' discount allowed as follows: Red Crown Ethyl, 3 cents off station price; Red Crown, 2½ cents off normal service station price; Nebraska Blue (third grade), 1 cent off normal service station price.

NAPHTHA

	Tank wagon	Tank car
Oleum spirits	10.7	6.23
V.M.P. naphtha	12.7	7.23
Cleaners' naphtha	15.2	9.23
Stanisol	15.2	9.23

Tank wagon prices f.o.b. Chicago January 6, 1932. Each of above prices subject to discount of 1 cent per gallon for 150-gallon lots if covered by contracts.

TANK WAGON CHANGES

Standard Oil Co. of Kentucky, effective May 26, reduced gasoline tank wagon and service station prices 1 cent at Jackson and Vicksburg, Miss. Effective June 1, company advanced gasoline tank wagon and service station prices at same points due to increase of one-half cent in state tax. Kerosene tank wagon prices were advanced 1 cent at same points due to establishment of state kerosene tax of 1 cent. Effective May 26, gasoline tank wagon and service station prices reduced 1½ cents at Mobile, Ala. Effective May 26, gasoline tank wagon and service station prices reduced one-half cent at Montgomery, Ala. Effective May 28, gasoline tank wagon and service station prices reduced 3 cents at Savannah, Ga. Effective May 28, gasoline tank wagon and service station prices reduced 1 cent at Miami, Fla. Effective May 28, gasoline tank wagon and service station prices advanced 1 cent at Pensacola, Fla. Effective May 29, company reduced gasoline tank wagon and service station prices from ½ to 1½ cents at most points in Kentucky. Effective May 28, gasoline tank wagon and service station prices reduced 1 cent at Atlanta and Macon, Ga., and one-half cent at Augusta, Ga. Effective May 24, company reduced gasoline tank wagon and service station prices 1 cent at Tampa, Fla.

Atlantic Refining Co., effective May 27, reduced gasoline tank wagon and service station prices 1 cent at Providence, R. I. Effective June 1, kerosene tank wagon prices reduced 1 cent in Massachusetts, Rhode Island and Connecticut.

Magnolia Petroleum Co., effective May 26, reduced gasoline tank wagon prices one-half cent in Texas and Oklahoma. Effective May 23, company reduced gasoline tank wagon and service station prices one-half cent at Little Rock, Ark. Effective May 27, company reduced gasoline tank wagon and service station prices 2 cents at Fort Smith, Ark.

CRUDE OIL PRICES

(Continued from Preceding Page)

siana, Gulf Refining Co. and Louisiana Oil Refining Co., April 11, 1932. Urania posted by H. L. Hunt, Inc., and Louisiana Oil Refining Co.; East El Dorado by Magnolia Petroleum Co., effective April 6, 1932; by Gulf Refining Co., effective April 11, 1932; Stephens, Ark., by Louisiana Oil Refining Co. and Atlantic Oil Producing Co.

SOUTH CENTRAL AND SOUTHWEST TEXAS

Darst Creek (Apr. 1, 1932)*	$ .75
Luling (Apr. 1, 1932)*	.64
Mirando (Apr. 1, 1932)*	.90
Pettus (Apr. 11, 1932)†	1.00
Salt Flat (Apr. 11, 1932)†	.75
Thrall‖	
Lytton Springs (Lockhart) (Apr. 1, 1932)*	.94
Dobrowolski‖	
Same as Mid-Continent gravity scale up to and including 38-38.9*	
Somerset‖	
Same as Mid-Continent gravity scale up to and including 38-38.9*	

*Magnolia Petroleum Co., The Texas Company, Humble Oil & Refining Co. posted 80 cents for Mirando, April 11. ‖Thrall prices same as North Central Texas less 19½ cents per cwt. freight. ¶Grayburg Oil & Refining Co., Pioneer Oil & Refining Co. and Texas Petroleum Products. ‖Pioneer Oil & Refining Co. ‡Humble Oil & Refining Co.

MIDDLE WESTERN STATES

Ohio Oil Co.
(Effective April 11, 1932)

Lima	$1.15
Wooster	1.25
Illinois	1.10
Indiana	.75
Princeton	1.10
Plymouth	Shut in
Western Kentucky	1.05
Midland, Mich. (May 17, 1932)*	.65
Muskegon†	.95
Muskegon‡	.85
Somerset, Ky. (Apr. 25, 1932)	.85
Hart County, Ky. (Apr. 16, 1932)§	.85

*Posted by Pure Oil Co. Old Dutch Refining Co. pays 20 cents per barrel over Pure Oil Co.'s posted price. †Naph-Sal Refining Co. ‡Old Dutch Refining Co. §Posted by Stoll Refining Co. Somerset, Ky., crude purchased by Ashland Refining Co., Ashland, Ky., and delivered through own pipe line.

MEXICO

Panuco*	$ .47

*F.o.b. ship, based on April transactions and exclusive of production and export taxes and bar dues.

CANADA

Ontario (Nov. 3, 1931):	
Petrolia*	$1.90
Oil Springs*	1.97
Alberta (Apr. 22, 1932):	
Turner Valley†:	
Crude oil 40-44.9	1.50
Crude oil 45-45.9	2.15
Crude oil 50 and above	2.80
Crude naphtha	3.33
Discolored naphtha	2.08

*Imperial Oil, Ltd. †Imperial Oil, Ltd., and Regal Oil & Refining Co.

Of Interest to Sales Departments

Exports Decrease And Imports Gain In Month of April

WASHINGTON, D. C., June 4.—Exports of petroleum and products decreased from 23,553,735 bbls. in April, 1931, to 19,867,201 bbls. in April, 1932. In the same period imports increased from 9,155,433 bbls. in April, 1931, to 10,923,425 bbls. in April, 1932.

Exports of crude petroleum increased from 1,825,813 bbls. valued at $1,546,021 in April, 1931, to 2,866,774 bbls. valued at $2,785,480 in April, 1932. During these same periods imports of crude almost doubled, the imports in April, 1931, being 4,162,259 bbls. valued at $3,797,845, increasing to 7,693,505 bbls. valued at $5,255,061 in April, 1932. This increase was much in excess of the average imports for the first four months of this year. The imports for the first four months of 1931 totaled 17,018,591 bbls. increasing to 19,301,616 bbls. in the same period of this year.

Refined oils exported declined from 7,508,888 bbls. valued at $20,532,956 in April, 1931, to 6,931,154 bbls. valued at $15,865,691 in April, 1932. At the same time imports of advanced and refined oils increased from 3,443,137 bbls. valued at $5,197,237 in April, 1931, to 4,712,601 bbls. valued at $5,608,194 in April, 1932.

Exports of gasoline, naphtha and other finished light products in April, 1931, totaled 3,947,745 bbls. valued at $10,367,775, declining to 3,567,972 bbls. valued at $8,324,206 in the same month of this year. Exports of gasoline for the first four months of this year have declined from 15,036,514 bbls. in 1931 to 12,607,388 bbls. in this year. Imports of gasoline, naphtha and other light products increased from 1,347,575 bbls. valued at $3,727,758 in April, 1931, to 1,746,037 bbls. valued at $3,772,223 in April, 1932. In the first four months gasoline imports were 5,018,703 bbls., increasing to only 5,321,312 bbls. in the same period of this year.

Exports of illuminating oil declined from 753,088 bbls. in April, 1931, to 578,473 bbls. in the same month of this year. Exports of gas oil and distillate fuel oil declined from 2,093,961 bbls. in April, 1931, to 1,049,260 bbls. in the same month of this year.

Exports of fuel and bunker oil declined from 4,043,473 bbls. in April, 1931, to 3,435,630 bbls. in April of this year. There was a decrease in exports of lubricating oil from 705,214 bbls. valued at $5,553,613 in April, 1931, to 531,643 bbls. valued at $4,001,284 in April of this year.

Exports of lubricating greases increased from 5,830,419 pounds in April, 1931, to 5,603,643 pounds in April, 1932. In these same periods paraffin wax decreased from 21,368,874 pounds to 18,873,788 pounds. Unrefined paraffin wax exports decreased from 7,692,103 pounds to 5,512,002 pounds and refined paraffin was decreased from 13,676,771 pounds to 13,361,986 pounds. Paraffin and paraffin wax imports decreased from 3,842,481 pounds to 1,953,735 pounds from April, 1931, to the same month of this year.

PETER C. BECKER DIES

Peter C. Becker, marine sales manager of the Associated Oil Co., died May 31 from a heart attack suffered while playing golf Memorial Day at the Palos Verdes Golf Club.

The body of Mr. Becker, who was retired with rank as lieutenant after 20 years' service in the Navy, was buried at Arlington National Cemetery, Washington, D. C.

CHART SHOWS THAT PETROLEUM MAINTAINS COMPETITIVE PLACE

By R. C. Conine

CHICAGO, June 4.—Continued price cutting in all types of industrial and domestic fuels, which has resulted from failure to curtail production in the face of slackened demand, has not lessened the advantage of petroleum distillates and residue as fuels from the standpoint of economy as well as facility in handling, it may be ascertained by aid of the accompanying graph. The curves represent the fuels most commonly used in this district: coke, anthracite, pocahontas, fuel oils and Illinois bituminous. The price per therm of the natural-artificial gas blend sold in Chicago is found on the base line, while prices per gallon or ton of the other fuels is shown on the ordinate.

Purely from the standpoint of economy, petroleum coke is, according to experts, the most desirable fuel. Offsetting the low initial cost and high calorific value of petroleum coke, however, is the higher handling charges and the need for special care to avoid tracking oil over the floor. The coal and coke prices given here are f.o.b. dealers' yards in quantities of 3 tons or more, and do not allow for extra charges such as labor, which range from 75 cents to $1.50 per ton. Nor are such costs as ash removal and the like taken into consideration. In connection with the varying prices of gas per therm the $24 per year minimum charge per meter is ignored.

The figures on efficiency apply to conditions found outside of large industrial plants where considerable outlay has been made to obtain maximum fuel economy. All of the values and costs presented below are decidedly on the conservative side. For the purpose of comparison the price of gas to be used in space heating apparatus is given: First 2 therms, 58 cents; next 14 therms, 16.7 cents per therm; over 16 therms, 7.5 cents per therm. There is a delayed payment charge of 1.88 cents per therm. The average user of gas consumes 2,500 therms during the heating season, and according to figures compiled by the gas company the cost of gas to the average buyer is 8 cents per therm. This price has been reduced successively as follows: Original rate, 14.5 cents per therm; old No. 4 rate, 13.7 per therm; radiation charge rate, 10.0 cents per therm; new No. 4 rate, 8 cents per therm.

Referring to the graph we find the following equivalent prices for coke, coal, fuel oils and gas: Coke at $4 a ton, 1.56 cents per therm; coke at $8.50 a ton, 3.32 cents per therm. Fuel oil at 4 cents a gallon, 3 cents per therm; fuel oil at 6 cents a gallon, 4.5 cents a therm. Illinois bituminous at $5 a ton, 3 cents per therm; Illinois bituminous at $8 a ton, 6.25 cents per therm, and at $14 a ton, 10.93 cents per therm. Anthracite at $6 a ton, 2.38 cents per therm; at $8 a ton, 3.18 per therm; at $10.35 a ton, 4.11 cents per therm, and at $15 a ton, 5.968 cents per therm. Pocahontas at $6 a ton, 3.46 cents per therm; at $10 per ton, 5.12 cents per therm; at $15 a ton, 7.75 cents per therm.

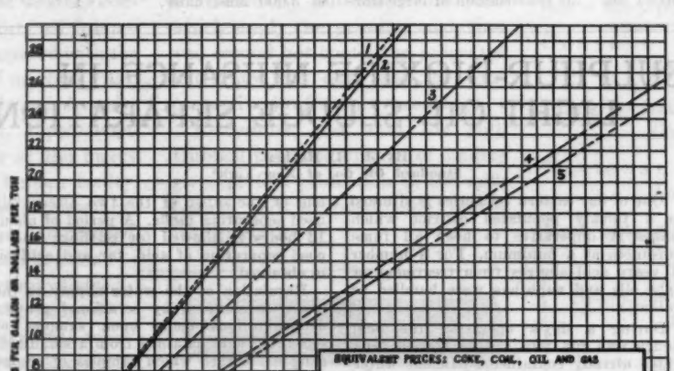

EQUIVALENT PRICES: COKE, COAL, OIL AND GAS
1. COKE, 14,800 B.t.u./lb. AT 65 % EFFICIENCY.
2. ANTHRACITE, 14,500 B.t.u./lb. AT 65 % EFFICIENCY
3. POCAHONTAS, 14,500 B.t.u./lb. AT 50 % EFFICIENCY
4. FUEL OIL, 142,000 B.t.u./gal. AT 70 % EFFICIENCY
5. ILL. BIT., 12,000 B.t.u./lb. AT 40 % EFFICIENCY
CHICAGO GAS, 525 Cu.Ft./THERM AT 75 % EFFICIENCY
CENTS PER GALLON OR DOLLARS PER TON
CENTS PER THERM OF GAS

Chart showing relative cost of fuels.

NEW RETIREMENT PROGRAM

NEW YORK, June 4.—Vacuum Oil Co., Inc., has completed a group retirement annuity plan for company workers, C. E. Arnott, president, announced here this week. The plan affects approximately 8,000 employes in the United States and Canada, through a revision of a former plan which places the entire program on a co-operative, contractual basis under the administration of the Metropolitan Life Insurance Co.

To the annuities and death benefits provided by the plan privately operated by Vacuum during the past 12 years are added accidental death and dismemberment insurance.

STOP NIGHT DELIVERIES

A new law which has become effective in Mississippi prohibits the delivery of gasoline between 9 p.m. and 5 a.m. The legislature provided for this prohibition in connection with the state gasoline tax which on June 1 was increased from 5½ to 6 cents. The state tax commission has added five inspectors to assist in collecting the gasoline tax.

DUTCH-SHELL WIDENS BY-PRODUCT MARKETS

NEW YORK, June 4.—Royal Dutch-Shell is continuing its research work looking to the further development of by-products of petroleum production and refining, according to the company's annual report.

"We are continually devoting our attention to the finding of new uses for the surplus of natural and crack gases," says Sir Henri Deterding's report, "and it is to this end that we have entered the field of the nitrogen compound industry.

"With the experience acquired in the artificial fertilizer factor at Vensen, Holland, where hydrogen from the blast furnaces is bound with nitrogen from the air to form ammonia, which is further processed to ammonium sulphate, calcium nitrate and various phosphate fertilizer mixers, a start was made in 1930 with the building of a nitrogen plant for the Shell Chemical Co. at San Francisco. In this plant, which was taken into use on September 1, 1931, the hydrogen required for the manufacture of ammonia is obtained from natural gas, while the ammonia produced is partly worked up further to ammonium sulphate.

"A market is fully assured also for the fertilizers from these plants, but keen competition from abroad, especially in Holland, where the market is not protected by tariffs, has caused prices to fall."

The report disclosed that Royal Dutch has started operations at its new tank-gas-treating plant at Pangkalan Brandan and the new sulphuric acid factory at Balikpapan, both in the Dutch East Indies.

DECLINE IN CANADIAN IMPORTS DURING APRIL

CHATHAM, Ontario, June 4.—Official figures show that imports of petroleum products into Canada for April were valued at $2,081,229, as against $2,496,655 in April, 1931. The bulk of these imports came from the United States. Detailed comparative figures of the various items are as follows:

	April, 1932	April, 1931
Oil for mining	$2,885	$2,516
Crude (.8235-.775)	79	69
Crude (.7900)	1,009,628	1,051,780
Crude (.725-.770)	90,340	786
Crude (.8235)	39,231	80,790
Fuel oil	18,149	11,042
Illuminating oil		2,116
Distillate	1,164	1,739
Coal oil	5,539	12,607
Casinghead	54,694	95,096
Gasoline	499,076	791,438
Lubricating oil	119,473	171,839
Lubricating oil	184,355	307,441
Mineral oil	4,592	10,394
Axle grease	9,698	22,324
Vaseline	22,550	12,998
Paraffin wax	3,633	4,591
Candles	3,161	3,455
Naphtha (n.o.p.)	12,937	12,715

A noteworthy feature of the comparative figures is the decrease in the major manufactured items.

KROGER SELLING MOTOR OILS

The Kroger Grocery & Baking Co. has started the distribution of motor oils at its chain of grocery stores which is the second largest in United States. Eight hundred stores are now handling the oils and within a short time the oils will be available at 3,400 stores. The oil is sold in 8-quart containers at $1. It is advertised as a 100 per cent Pennsylvania oil.

RESTRICT STORAGE CAPACITY

The city council of Los Angeles has passed an ordinance to limit the storage capacity of gasoline tanks at service stations to 10,000 gallons. The limitation is not retroactive.

Brief Items for Petroleum Refiners

Appoint Receiver For Properties of Interocean Company

NEW YORK, June 4.—Judge W. A. Chesnut, sitting in U. S. District Court at Baltimore, has appointed Joseph P. Connor receiver for the Interocean Oil Co. and has issued a writ of injunction to restrain interference with the sale of the company's property. A petition for the receivership was filed by the Baltimore Trust Co. under the terms of a deed of trust executed in 1925 in consideration of the issuance of $2,000,000 of first mortgage 10-year 7 per cent convertible sinking fund bonds.

Interocean Oil, in addition to interest, agreed to pay to the Baltimore Trust Co. $150,000 annually in semiannual instalments, beginning June 1, 1926, according to the bank's petition. Defaults were made in interest July 1, 1931, and again January 1, this year, the petition states, and the payment semiannually of $75,000 as agreed upon was said to have been in continuous default since June, 1927.

Interocean Oil Co. was incorporated in Delaware in 1924, and acquired the properties of Lorraine Petroleum Co. and Livingston Petroleum Corp. and the refining properties of the Interocean Oil Co. The company has a refinery at Curtis Bay, just outside of Baltimore, and has an interest in 20,000 acres of oil and gas leases.

FRENCH REFINERY TO OPERATE NEXT YEAR

NEW YORK, June 4.—The Normandy refinery of Compagnie Francaise des Petroles, now under construction near Havre, will be completed and will go into operation in the spring next year, said E. F. H. Mercier, president, at the company's annual meeting in Paris this week. Operation of the company's refinery at Berre, near Marseilles, has been delayed, he said.

Compagnie Francaise des Petroles holds the French 23¾ per cent interest in Iraq Petroleum Co., representing the French government holding in Iraq. Iraq Petroleum, M. Mercier said, now has 31 wells producing in the Kirkuk fields and will develop additional production so that the annual output will equal the 4,000,000 tons' annual capacity of the Iraq pipe line, when completed.

The report of the French company discloses that Mediterranean Pipe Lines, organized in Canada, has been formed as a subsidiary of Iraq Petroleum Co. and has acquired the lands required for the Iraq pipe line.

WICHITA REFINERS MAY BUILD GASOLINE LINE

WICHITA FALLS, Tex., June 4.—Several refiners in this city and nearby towns are considering the construction of a 3-inch gasoline line to Devol, Okla., which is 18 miles north of here across the Red River. The line will be used to transport gasoline from local refineries to Devol where it will be loaded in tank cars. It is stated that the line can be built for $35,000.

The purpose of the line, if built, will be to reduce transportation charges. At present local refineries pay 2½ cents per 100 pounds over the Oklahoma refinery rates in shipments to northern and eastern customers. A recent request that this differential be reduced 1 cent per 100 pounds was refused by the railroads. It is said that the line will result in a saving which will return the investment to the refiners in a few months.

PLAN CONSTRUCTION OF THREE NEW REFINERIES FOR CANADA

With work already under way at one refinery and definite plans for building two more plants, an active period is in prospect for refinery construction in the eastern part of Canada.

The Joseph Ellie, Ltd., has started construction work at its new plant located at East Montreal, Quebec. It is expected that the plant will be completed by October. A contract has been placed with the Foster Wheeler Corp. for an atmospheric distillation unit to be installed at the refinery. The equipment will be manufactured at the St. Catherines, Ontario, works of the Foster Wheeler Corp. which will supervise the construction of other features of the plant.

It is understood that the refinery will be operated under the name of the La Salle Petroleum Refinery, Ltd. The Joseph Ellie, Ltd., is a marketing concern with headquarters in Montreal.

According to reports from Canada the American Shell interests have purchased a refinery site adjacent to that of the La Salle corporation. The plans call for the construction of a light oil refinery at the site involving an expenditure of $2,000,000. The Shell plant will include cracking equipment. The products of the plant will be distributed in Canada by the Shell Co. of Canada, Ltd.

The plans of the company include the construction of a two-berth dock on the St. Lawrence River for the unloading of tankers carrying crude petroleum; the erection of pipe lines from the river front to the refinery site north of Sherbrooke Street east; the construction of large storage tanks and erection of the refinery plant proper.

The Shell company, it is pointed out, has been importing gasoline and oil products from Venezuela in its own tank steamers. On completion of the new Montreal East refinery, crude petroleum only will be imported and refined in the new plant, the products being distributed by tank steamer down the St. Lawrence and up the Great Lakes. It is stated also that the refined gasoline will be taken to the western coast of Canada through the Panama Canal.

The Shell oil refinery will make Montreal East more than ever a most important oil refining center. In addition to the two new refineries to be completed this year, namely those of the Shell Oil Co. of Canada, Ltd., and the La Salle Petroleum Refinery, Ltd., there are at present located there such large refineries as those of Imperial Oil, Ltd.; Frontenac Oil Refinery, Ltd., subsidiary of the McColl-Frontenac Oil Co., Ltd.; and the British American Oil Co.

The third new plant in prospect is that of the Cities Service Co. interests. Definite plans for this refinery have not been announced but it is understood that it will be located at Toronto. The plant will have sufficient capacity to take care of Cities Service distribution in Canada.

In addition to the three new projects, the Simrall Refining Corp., Ltd., is now operating its refinery located at Amherstsburg, Ontario, which is across the river from Detroit. The plant has a capacity of 3,000 bbls. daily.

SULPHUR-DIOXIDE NUISANCE IN LIGHT-OIL SLUDGE SEPARATION

By J. B. Rather
Standard Oil Co. of New York*

One of our eastern refineries is situated in a thickly populated district which makes it imperative to keep all fume nuisances at a minimum. For a number of years acid sludges from treatment of light oils and naphthas were handled as follows:

During a day's operation the acid sludge was run into a cone bottom tank which already contained sufficient water to produce separated acid of the desired gravity. The acid sludge and the water were then agitated with low-pressure air for a few minutes. After a settling period, a fairly good separation of acid, tar and acid oil could be made.

During the air agitation, large amounts of sulphur dioxide were evolved, and the fact that the sulphur dioxide was practically evolved all in the space of a few minutes made its disposal a troublesome matter.

Separation of Acid, Tar and Acid Oil

It is well known that fresh light-oil sludges can be treated with water and separated with practically no evolution of sulphur dioxide, and the following scheme was devised in order to make use of this fact. A small tower 10 inches in diameter and 24 feet high was constructed of antimony lead. Acid sludge and water are continuously delivered into the bottom of the tower along with air for agitation. The mixture of sludge and water is discharged at a point about 3 feet below the top of the tower, from which the mixture flows by gravity into one or the other of the two alternately used separating tanks. A period of about 12 hours is allowed for settling; and a good separation of acid, tar and acid oil is obtained.

Regulation of the water supply to the tower is obtained by occasional gravity determinations made upon samples of separated acid obtained from a small settling drum into which samples of sludge and water can be tapped directly from the tower.

The tower whose dimensions have been given will handle about 16 bbls. per hour of combined acid sludge and water. In cold weather it is sometimes necessary to heat the water before mixing with the sludge.

The use of the device described has completely eliminated the fume nuisance connected with the old method of handling acid sludge; and, in addition to this, a cleaner separated acid is obtained. It is, of course, obvious that this method is adapted for use only with sludges that are quite fluid in nature.

*Delivered before convention A.P.I., Tulsa, June 1-3.

CARL G. BROWNLEE DIES

Carl G. Brownlee, manager of the Union Oil Co.'s refinery at Los Angeles, died May 30 at a hospital in Long Beach. He had undergone an abdominal operation the day before.

Mr. Brownlee had been with the Union Oil Co. 10 years, the first four as superintendent of the refinery at Vancouver, British Columbia, and since 1926 in his present post.

Warner-Quinlan to Distribute Cities Service Products

NEW YORK, June 4.—The Warner-Quinlan Co. late this month will commence the distribution of Cities Service gasoline and lubricating oils, it is disclosed in a joint announcement made by the two companies here today.

The arrangement, according to W. W. McFarland, president of Warner-Quinlan Co., has been made necessary "by the increased demand for very high octane gasoline and that the company's refinery at Warners could continue to meet this demand only by extensive additions to the refining equipment. Under present conditions it did not seem wise to make the necessary investment in new equipment. Instead the company entered into a contract to purchase their requirements of premium gasoline from Crew-Levick Co., a Cities Service subsidiary.

The arrangement between the two companies is taken in financial circles here as confirmation of reports of some months ago that Cities Service Co. had acquired a controlling stock interest in the Warner-Quinlan Co. The latter company has a 20,000-bbl. refinery at Warners, N. J., with a large number of stations and dealers in eastern states.

SUPREME COURT UPHOLDS GASOLINE STORAGE TAX

The South Carolina gasoline storage tax was held valid by the Supreme Court of the United States on May 31. The case is entitled Gregg Dyeing Co. v. Query, No. 170.

The South Carolina law provides for a tax on gasoline imported into that State from other states, and which for 24 hours after the interstate character of the shipment is lost is kept in storage in the state to be used and consumed therein.

In the final analysis, the burden of the tax rests upon the consumer, the Supreme Court pointed out. "Appellants and others who use gasoline in their business enterprises pay the same amount on the gasoline they consume," the decision said. "Appellants had the burden of showing an injurious discrimination against them because they bought their gasoline outside the State. This burden they have not sustained. They have failed to show that whatever distinction there existed in form, there was any substantial discrimination in fact."

ASSOCIATED TO BUILD VACUUM RERUN STILL

The Associated Oil Co. has placed a contract for the installation of a vacuum rerun distillation unit at its Avon, Calif., refinery. The unit which will be installed by the Foster Wheeler Corp. is designed primarily to process treated lubricating oils.

The Avon refinery has a crude oil capacity of 55,000 bbls. daily. The refinery manufactures a complete line of lubricating oils from California crude oils.

TIDE WATER UNITS OPERATING

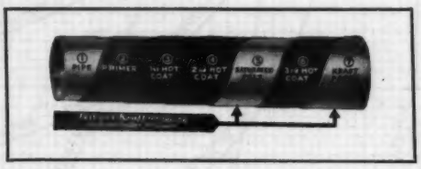
NEW YORK, June 4.—Tide Water Oil Co. has started operation of its new cracking coils and stabilizer plant at the company's refinery at Bayonne, and is introducing a new high-test "Tydol" gasoline in East Coast markets. The new units, which were installed by Lummus & Co., have been under construction at Bayonne during the past year.

Do you want ECONOMY?

General Paint Corporation's Hill-Hubbell Process of mill-coated-and-wrapped pipe means a saving on coating and wrapping costs, economy of laying and decided savings in replacement charges. No matter how good the protective coatings applied in the field, changeable weather conditions and unreliability of human application, when compared with the scientific exactness of machine-coating-and-wrapping, always increase field application cost. Pipe coated in the field is always at the mercy of the elements and human frailty. It must be cleaned and reprimed before the work of coating can proceed. The ever-present possibility that moisture, grease or dirt may lodge in the priming coat, or succeeding coats, are danger points for future corrosion and weakening.

Weather conditions may easily retard the application of the protective coatings in the field. But there are no waits at the mill. The weather and temperature are "made to order" because the whole process is completed indoors, with temperature of all coating materials scientifically regulated. The clean, new pipe is treated by automatic machines which apply the priming coat, first and second hot coats, the saturated felt, third hot coat and the final protective kraft paper wrapping.

Remember, too, that the Hill-Hubbell patented system of loading gives perfect protection to the mill-coated and wrapped pipe during transportation.



For complete information write to any of the offices of the General Paint Corporation.

Plants for coating and wrapping by the Hill-Hubbell Process are located in the following cities for the production of the pipe manufacturers listed:

CENTRAL TUBE COMPANY
Ambridge, Pa.

JONES & LAUGHLIN STEEL CORP.
Aliquippa, Pa.

NATIONAL TUBE COMPANY
Lorain, Ohio

REPUBLIC STEEL CORPORATION
Youngstown, Ohio

SPANG-CHALFANT & COMPANY
Ambridge, Pa.

YOUNGSTOWN SHEET & TUBE CO.
Indiana Harbor, Ind., and Youngstown, Ohio

HILL-HUBBELL DIVISION OF

GENERAL PAINT

CORPORATION

Portland, Ore.; Seattle, Wash.; Houston, Texas; Spokane, Wash.

New York, 11 Broadway
Chicago, address Hill-Hubbell & Co., 105 West Adams Street

Tulsa, Oklahoma
Los Angeles, 544 Mateo Street
San Francisco, 160 Fremont St.

Manufacture of Natural Gasoline

April Production California Nearer To Market Demands

California added less to its natural gasoline stocks in April than in March and came much closer to balancing production with demands. Refiners increased the volume of natural gasoline taken into their plants to 25,643 bbls. daily in April compared with 21,881 bbls. in the previous month.

Atlantic and foreign shipments also increased for the month. Stocks at the end of April amounted to 2,922,530 bbls. compared to 2,656,149 bbls. at the beginning of the month, an increase of 266,381 bbls. The detailed statistics as compiled by the California division of the Bureau of Mines appears below:

CALIFORNIA NATURAL GASOLINE STATISTICS FOR MARCH AND APRIL
(Daily average)

	Bbls. April	Bbls. March
Total production	37,559	37,835
Stock trans. (deliv.) receipt—net	29	2,841
Total	37,588	40,726
Deduct: Ref. requirements:		
Runs to stills	4,251	3,530
Blended	21,392	18,351
Total	25,643	21,881
Gains (losses) unaccounted for—net	1,900	2,352
Net supply available to market	13,945	16,492
Demand—		
Domestic consumption inc. bunkers	432	451
Off shore shipments:		
Alaska and Hawaii	9	3
Pacific foreign exports	419	320
Atlantic foreign exports	3,214	740
Rail and truck shipments to U. S. points outside Pacific Coast territory	2	0
Total market demand	4,066	1,519
Surplus or (deficit)	9,879	14,972
Stocks—last day of period—		
Total stocks	2,922,328	2,656,750
Outside U. S. (inc. Alaska, Hawaii and Canal Zone)	677	494
Inside U. S., outside Pacific Coast territory	116	87
Inside Pacific Coast territory, at refineries	2,222,320	2,060,028
Elsewhere	699,710	596,111
Inside Pacific Coast territory—last day	2,922,530	2,656,149
Inside Pacific Coast territory—first day	2,656,149	2,191,990
Increase or (decrease) during the period	266,381	464,159

OPERATING DATA FOR APRIL

Number of plants operating	113
Daily capicity in 1,000 cu. ft.	2,664,701

PRODUCTION BY FIELDS

	Gas treated (thousand cu. ft.)	Natural gasoline produced (gallons)
Fullerton and Whittier	620,995	1,318,805
Midway	1,749,270	3,126,635
Huntington Beach	446,657	1,506,371
Kettleman Hills	7,406,892	10,946,933
Long Beach	4,001,835	9,360,443
Richfield	408,817	499,583
Santa Fe Springs	5,840,546	8,676,985
Seal Beach	512,535	969,704
Ventura Avenue	2,958,799	2,998,169
All other fields	5,310,956	7,526,382
Total	29,259,302	46,932,930

PRODUCTION BY METHODS

Type of plant—	Gas treated m.c.f.	Natural gasoline produced (gallons)	Gasoline recovery per m.c.f. gas treated
Oil absorption	20,096,972	46,740,179	1.606
Compressor	162,330	192,751	1.180
Total	29,259,302	46,932,930	1.604
			Bbls.
Finished gasoline produced at plants			189

STOCKS OF NATURAL GASOLINE

	Gallons	Bbls.
Natural gasoline held by plant operators	6,436,393	153,248
Natural gasoline held by refineries	116,309,844	2,769,282
Total	122,746,236	2,922,530

LIQUEFIED GAS—BARRELS

	April	March
Production	311	397
Sales	377	426

PRESENTS SALES ARGUMENT IN FAVOR OF NATURAL GASOLINE

The natural gasoline industry has developed an intricate and exacting procedure in the technique of manufacturing its products but has been accused by its own representatives as having failed to develop its sales technique in proportion. An excellent sales argument has been simply outlined in a paper prepared by Alois Kremser of the Standard Oil Co. of California and delivered before the American Petroleum Institute in Tulsa this week. He shows the volumetric relationship between the various constituents in motor fuels to yield the same vapor pressure. In other words, he shows how a refiner may decrease the propane content of his motor fuel by 1 volume and substitute nearly 5 volumes of butane without altering the vapor pressure of the product. That portion of Mr. Kremser's paper which relates to this relationship follows:

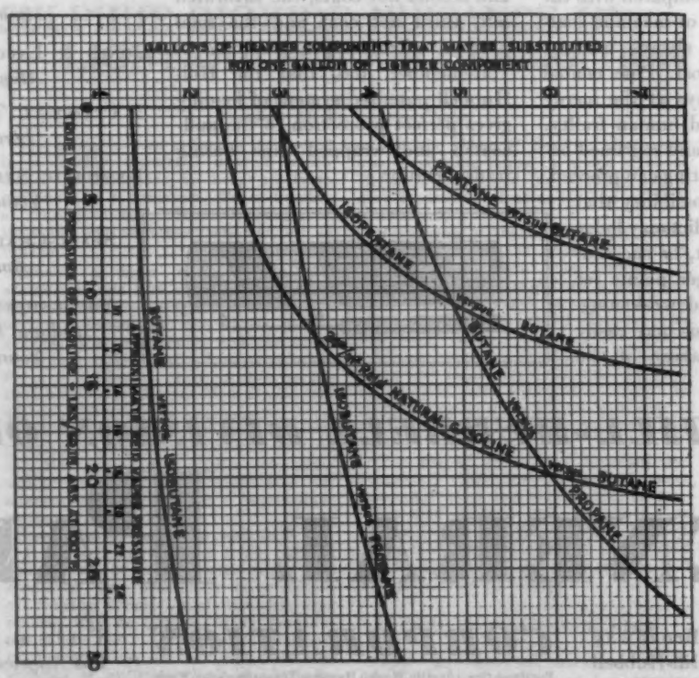
"The recent growth of the liquefied gas industry is closely related to the adoption of rectification in the manufacture of natural gasoline. It will be of interest, therefore, to review briefly the purpose of rectification. It may be defined simply as the replacement of high vapor pressure constituents by a larger volume of fractions of lower vapor pressure, to obtain any desired effective volatility within the limits of a fixed vapor pressure specification of a finished gasoline. These relations are illustrated in Figure 1, giving the relative volumes of different constituents of natural gasoline that may be substituted for each other without a change in the vapor pressure of the finished blend.

"It will be noted that, with a motor gasoline having a vapor pressure of 10 pounds per square inch at 100° F., elimination of 1 volume of propane will permit substitution of 3.3 volumes of isobutane, or 4.85 volumes of normal butane, with a net gain in production of 2.3 and 3.85 volumes, respectively, and a corresponding improvement in effective volatility as regards ease of starting, acceleration, etc. Aside from these economic relations, there is no inherent objection to the inclusion of propane in a motor gasoline, but evidently substitution of butane for propane is desirable as long as butane for this purpose is available.

"Removal of 1 volume of isobutane permits, with the same motor gasoline, substitution of 1.45 volumes of normal butane, with a net gain of only 0.45 volume. While inherently desirable, rectification for the purpose of substituting normal for isobutane may, therefore, in many instances prove uneconomical.

"If a surplus of natural gasoline is available, rejection of butane will, of course, permit inclusion of a larger percentage of natural gasoline in motor gasolines. A curve is included, Figure 1, giving the substitution value for butane of a typical natural gasoline of 24 pounds per square inch Reid vapor pressure. For a motor gasoline of 10 pounds per square inch vapor pressure, removal of 1 volume of butane will permit inclusion of about 3.05 volumes of natural gasoline. Since the butane content of such a gasoline will be slightly over 30 per cent, the 3 added volumes will contain nearly 1 volume of butane. The net result from substituting 3 volumes of natural gaso-

(Continued on Page 76)



*Theoretical substitution value of components of natural gasoline for constant vapor pressure of blend.**

*Note

$$\frac{x}{y} = \frac{d_y\, m_x}{d_x\, m_y} \times \frac{p_y - P}{p_x - P}$$

x volumes of heavy component substituted for y volumes of light components d, m and p denote specific gravity, molecular weight and vapor pressure of components; P is vapor pressure of blended gasoline; all vapor pressures at 100° F.

Liquefied Gas Co. Denied Petition As Public Utility

The Paramount Gas Utilities Co. was denied a petition to supply liquefied gas and issue stock as a public utility by the Public Utilities Commission and the order of the commission was confirmed by the State Supreme Court. An appeal has been filed by the company. The decision is of importance to natural gasoline companies which have gone into the business of manufacturing and distributing butane and other liquefied gases. The order of the commission denying the company the right to be classed as a public utility places the operation of such units entirely upon a competitive basis and the rates cannot be based upon investment and receive the protection given public utilities.

Parts of the evidence which prompted the decision follow:

"The entire plant belongs exclusively to the gas company, which also at its own expense keeps the buried tank supplied with the volatile oil, and sells the patron metered gas only. The company selects its own patrons, makes its own rate and determines whatever contractual relations are necessary to make the enterprise a financial success.

"No public property is entered upon; no streets or highways are to be crossed or encumbered by poles or pipes of the gas company. Territory can be served only where electric current is available for use in running the motor at the tank. Oil supplied for tanks is furnished by the gas company by the use of trucks traveling over public streets and alleys."

Parts of the decision follows: "It may also be true that important considerations exist which might very readily induce the gas company to have itself adjudged as a public utility. For instance, it might add very materially to the value, in the minds of investors, of the stocks and securities to be marketed by the gas company, to have it known that that company was clearly within the jurisdiction of the commission, which must supervise and approve any securities placed upon the market.

"And it might also be recognized that this public utility in its operations could not be unjustly interfered with by competition, and that the matter of competition was one that would be regulated by the commission.

"We think a protection against unreasonable and ruinous competition might be highly desirable for the gas company, and so desirable as to much more than counterbalance any possible restrictions upon the freedom of its action with regard to its securities or otherwise, which might arise by reason of its being adjudged such public utility.

"If any mercantile establishment, selling its goods to the public in general, could have its business adjudged as falling within the jurisdiction of the commission, and thereby eliminate, or at least greatly diminish, competitors from unfairly coming into a determined field, evidently all distinction between mercantile operations, carried on by persons, partnerships, corporations or associations, and public utilities, as now generally recognized by law, would promptly disappear, and the commission would quite as promptly be completely swamped in any effort the commission might make to take care of the situation thus arising, and general provisions of the public utilities law would become broadened far beyond anything that the legislature ever had in mind in the enactment of the public utilities statutes."

A.P.I. ESTIMATE ON DEMAND FOR GASOLINE

(Continued from Page 30)

"Regardless of the correctness of any series of estimates of production and shipments, it is beyond disputation that a balance between supply and demand may be struck if adherence is maintained to schedules of economic stocks."

Your committee has requested the statistical subcommittee to revise its report monthly that the industry may be currently informed of any changes apparent in the forecast of demand, stocks and crude oil requirements, this monthly revision to continue over the entire period between the issuance of the regular economics reports presented at the midyear and annual A.P.I. meetings.

Your committee recommends that the board of directors adopt a resolution requesting the Federal Oil Conservation Board's voluntary committee on petroleum economics to review its forecast and issue from time to time statements based thereon commenting on any changes from its forecasted trend of demand and crude oil requirements.

Respectfully submitted,

Committee on Refinery Statistics and Economics.

Albert J. McIntosh, chairman; Fred Van Covern, secretary; W. C. Allen, H. R. Armour, A. H. Hend, Edward T. Knight, Charles H. McNeese, E. P. Salisbury, J. M. Sands.

The committee desires to acknowledge the personal assistance rendered by Oliver S. Ambrose during the compilation of this report.

VENEZUELA REDUCES OUTPUT

NEW YORK, June 6.—Production of crude petroleum in Venezuela during the first three months of 1932 totaled 28,581,580 bbls., a daily average of 314,083 bbls., compared with 30,153,505 bbls., or 335,038 bbls. daily, in the first quarter last year, according to O'Shaughnessy's Oil Bulletin.

Shipments of crude from lake to ocean terminals in the first quarter this year amounted to 27,582,400 bbls., an average of 303,103 bbls. per day, against 30,665,360 bbls., or 340,725 bbls. daily in the first three months of 1931, when producers drew slightly against storage to round out shipment totals.

There were only three wells completed in the first quarter of the current year, as contrasted with 25 in the comparable months of 1931. Five wells were drilling in Venezuela on March 31, this year, as compared with 19 drilling on the same date last year.

TRAFFIC MEN ELECT

The Oil and Gas Well Supply Traffic Association held its spring meeting at Columbus, Ohio and elected officers for the ensuing year as follows: President, M. A. Keith, G.T.M., International-Stacey Corp., Columbus, Ohio; first vice president, C. R. Gartrell, T.M., Continental Supply Co., St. Louis, Mo.; second vice president, H. A. Bruner, T.M., Marion Machine, Foundry & Supply Co., Marion, Ind.; treasurer, R. S. Seibert, T.M., Lee C. Moore & Co., Pittsburgh, Pa., and secretary, V. E. Milsark, T.M., Parkersburg Rig & Reel Co., Parkersburg, W. Va.

ROCKY MOUNTAIN RUNS

Average daily pipe line runs from fields in the Rocky Mountain territory for the week ended June 4 follow:

	Bbls.
WYOMING	
Salt Creek	23,040
Badger Basin	50
Big Muddy	1,940
Byron-Garland	1,420
Dallas-Derby	580
Dutton Creek	70
Elk Basin	630
Ferris	20
Frannie	130
Grass Creek	2,030
Hamilton Dome	740
Hudson	470
LaBarge	1,460
Lance Creek	130
Lost Soldier	...
Midway	...
Oregon Basin	...
Osage	950
Pilot Butte	30
Rock River	1,730
Poison Spider	90
Teapot	20
Total Wyoming	35,510
MONTANA	
Buckley-Border	640
Cat Creek	860
Dry Creek	1,370
Kevin-Sunburst	3,340
Lake Basin	60
Pondera	1,300
Total Montana	7,570
COLORADO	
Florence	360
Fort Collins	820
Iles	630
Moffat	710
Orchard	280
Rangely	90
Tow Creek	280
Total Colorado	3,170
NEW MEXICO	
Rattlesnake	368
Hogback	370
Table Mesa	79
Artesia	505
Cap Rock	635
Hobbs	30,025
Jal	816
Lea City	1,835
Eunice	463
Texas Pacific	93
Total New Mexico	35,192
Total Rocky Mountain area	81,442
Total previous week	85,055
Difference	3,613

STANOLIND TO REDEEM BONDS

Stanolind Crude Oil Purchasing Co., subsidiary of Standard Oil Co. (Indiana), will redeem August 5, 1932, $10,000,000 worth of its outstanding 5½ per cent gold bonds, series A, due January 1, 1938. These bonds were originally issued by the then Sinclair Crude Oil Purchasing Co. and still bear the name of the company as it was before the full interest was taken over by Standard of Indiana and the name was changed to Stanolind. Of $42,000,000 worth of the bonds issued, approximately $31,000,000 were outstanding on May 27, 1932. The redemption will be at 102 and accrued interest. Numbers of the bonds to be redeemed have been drawn and will be advertised. Payment will be made by the First Union Trust and Savings Bank in Chicago or the Chase National or the National City Bank in New York. Money for the redemption is being provided by Standard Oil of Indiana largely from funds acquired in connection with sale of its interest in the foreign properties of the Pan American Petroleum & Transport Co.

JUNE REFINERY RUNS HELD TO DEMAND

(Continued from Page 26)

REFINERY OPERATIONS IN ARKANSAS

(Plants which have been in operation during the past year)

Company and location—	Daily capacity	Runs June 1	Runs May 1
James H. Berry & Sons, Waterloo	2,000	1,000	1,000
Henry H. Cross Co., Smackover	6,000	4,003	4,000
Houston Oil Co., Camden	6,000	(*)	(*)
Kettle Creek Refining Co., Pearson	5,000	1,800	1,800
Lion Oil & Refining Co., El Dorado	12,000	4,000	4,000
Macmillan Petroleum Products Co., Norphlet	2,000	2,000	1,800
Ouachita Valley Refining Co., El Dorado	2,000	1,200	1,000
Root Refining So., El Dorado	10,000	6,000	4,000
Simms Oil Co., Smackover	3,000	2,500	2,700
Union Asphalt Co., El Dorado†	.....	.....	.....
Total	48,000	22,500	20,300

*Shut down. †Reduces residuum purchased from Lion Oil & Refining Co., no crude run.

REFINERY OPERATIONS IN NORTH CENTRAL TEXAS

(Plants which have been in operation during the past year)

Company and location—	Daily capacity	Runs June 1	Runs May 1
Allstate Refining Co., Thrall	2,000	800	1,000
American Refining Properties, Wichita Falls	6,000	(*)	(*)
Shamrock Oil Co., Sunray	4,000	400	400
Archer Refining Co., Megargel	1,500	200	450
Atlantic, Pacific & Gulf Refining Co., Wichita Falls	5,000	(*)	(*)
Continental Oil Co., Wichita Falls	6,000	3,500	4,000
Dale Oil & Refining Co., Electra	4,000	(*)	(*)
Deer Oil Corp., Brownwood	2,000	(*)	(*)
Dixon Creek Oil & Refining Co., Kings Mill	3,500	900	800
Echotex Refining Co., Echo	3,000	100	100
Empire Oil & Refining Co., Gainesville	5,000	3,500	3,500
Falls Refining Co., Wichita Falls	2,000	200	700
Gratex Refining Co., Graham	500	150	150
Gulf Refining Co., Fort Worth	10,000	6,000	6,000
Humble Oil & Refining Co., Breckenridge	2,000	(*)	(*)
Humble Oil & Refining Co., Chilton	4,000	650	400
Humble Oil & Refining Co., Neches	5,000	1,685	1,650
Iowa Park Producing & Refining Co., Iowa Park	2,500	300	400
Kent Refining Co., Minerva	2,000	350	350
Kent Refining Co., Angus	4,000	150	150
LaSalle Petroleum Co., Burkburnett (Noble)	3,500	(*)	(*)
Macmillan Petroleum Co., Isom	3,000	(*)	(*)
Magnolia Petroleum Co., Fort Worth, No. 1	12,000	1,200	2,200
Magnolia Petroleum Co., Fort Worth, No. 2	6,000	5,400	3,400
Magnolia Petroleum Co., Corsicana	5,000	4,600	4,600
Marathon Oil Co., Fort Worth	5,000	4,000	3,800
Muenster Refining Co., Muenster	300	(*)	(*)
Olney Oil & Refining Co., Olney	2,500	1,500	2,000
Oriental Oil Co., Dallas	5,000	1,500	1,300
Panhandle Refining Co., Wichita Falls	5,000	2,700	2,000
Petroleum Refractionating Co., Pampa	6,500	5,000	6,000
Phillips Petroleum Co., Isom	18,000	19,000	17,000
Primrose Refining Co., Wichita Falls	2,500	(*)	(*)
Sinclair Refining Co., Fort Worth	5,000	2,500	2,500
Simms Oil Co., West Dallas	4,500	3,000	3,000
Southland Refining Co., Olney	1,000	170	200
Seymour Refining Co., Seymour	250	(*)	(*)
Star Refining & Producing Co., Fort Worth	1,500	750	700
Superior Refining Co., Tiffin	2,000	(*)	(*)
Taylor Refining Co., Taylor	6,000	1,400	1,400
Taxman Refining Co., Wichita Falls	2,500	2,950	2,700
The Texas Company, Dallas	16,000	15,000	15,000
The Texas Company, Amarillo	4,000	2,000	2,000
Tidal Western Refining Co., Burkburnett	3,000	(*)	(*)
Texas Pacific Coal & Oil Co., Fort Worth	3,000	2,500	2,000
Texas Pacific Coal & Oil Co., Caddo	1,000	600	500
Waggoner Refining Co., Electra	3,400	3,000	1,500
Wilcox Oil & Gas Co. (Pampa Refining Co.), Pampa	4,000	(*)	(*)
Young Refining Co., Archer City	250	(*)	(*)
Total	204,000	97,455	93,850

*Shut down.

REFINERY OPERATIONS IN OKLAHOMA

(Plants which have been in operation during the past year)

Company and location—	Daily capacity	Runs June 1	Runs May 1
Altitude Petroleum Corp., Oklahoma City	3,000	700	800
Anderson-Prichard Oil Corp., Cyril	5,000	3,000	4,200
Barnsdall Refineries, Inc., Barnsdall	6,000	4,000	3,500
Barnsdall Refineries, Inc., Okmulgee	10,000	3,500	5,000
Bell Oil & Gas Co., Grandfield	4,500	2,200	1,800
Black Gold Refining Co., Oklahoma City	1,500	750	750
Capital City Refining Co., Oklahoma City	2,500	150	150
Century Petroleum Co., Tulsa	500	(*)	(*)
Century Petroleum Co., Oklahoma City	2,500	1,000	1,500
Champlin Refining Co., Enid	16,000	8,500	8,000
Continental Oil Co., Sapulpa	10,000	1,800	1,500
Continental Oil Co., Ponca City	30,000	11,600	9,000
Cushing Refining & Gasoline Co., Blackwell	1,800	1,000	1,500
Cushing Refining & Gasoline Co., Cushing	3,500	2,000	3,000
Deep Rock Oil Corp., Cushing	10,000	10,000	10,000
Eason Oil Co., Enid	5,000	3,000	3,000
Empire Oil & Refining Co., Okmulgee	4,000	3,500	3,500
Empire Oil & Refining Co., Ponca City	12,000	8,000	5,700
Garber Refineries, Inc., and Omar Refining Co., Garber	3,500	2,200	2,200
Globe Oil & Refining Co., Blackwell	7,500	6,500	6,500
Gulf States Oil Corp., Oklahoma City	3,500	700	800
Johnson Oil Refining Co., Cleveland	6,000	4,500	4,800
Major Oil Co., Oklahoma City	2,000	200	200
Mid-Continent Petroleum Corp., West Tulsa	40,000	19,000	20,000
Marathon Oil Co., Boynton	2,500	1,700	1,000
Marathon Oil Co., Bristow	5,000	(*)	(*)
Phillips Petroleum Co., Okmulgee	5,000	3,500	4,500
Producers Oil Co., Bristow	2,500	1,000	1,000
Producers & Refiners Corp., West Tulsa	6,000	4,000	4,000
Pure Oil Co., Ardmore	5,000	2,400	2,300
Pure Oil Co., Muskogee	9,000	7,000	7,000
Rock Island Refining Co., Beckett	5,000	4,500	4,000
Sinclair Refining Co. (Pierce), Sand Springs	8,000	2,300	2,300
Sterling Refining Co., Oklahoma City	2,000	650	650
Sun Oil Co., Yale	5,000	3,500	3,500
Sunray Oil Co. (C. E. Wright, receiver), Allen	7,000	4,000	3,000
The Texas Company, West Tulsa	15,000	10,000	8,000
Texas Pacific Coal & Oil Co., Wynnewood	3,000	2,000	1,000
Tidal Refining Co., Drumright	15,000	9,000	9,000
Western Oil Corp., Beckett	2,000	(*)	(*)
White Oak Corp., Allen	8,000	(*)	(*)
Wilcox Oil & Gas Co., Bristow	5,000	3,500	3,500
Wirt Franklin Petroleum Corp., Ardmore	4,000	2,000	3,150
Yale Oil Corp., Yale	2,000	500	500
York Refining Co., Oklahoma City	3,000	250	300
Total	309,300	159,600	159,100

*Shut down.

REFINERY OPERATIONS IN EAST TEXAS

(Plants which have been in operation during the past year)

Company and location—	Daily capacity	Runs June 1	Runs May 1
Arrow Refining Co., Overton	2,500	800	(*)
Beacon Oil & Refining Co., Henderson	2,500	950	1,000
Boone Refining Co., Arp	500	700	600
Central Refining Co., Friars Switch	10,000	(*)	(*)
Constantin Refining Co., Overton	3,000	(*)	(*)
Diamond Refining Co., Overton	3,000	450	400
East Texas Refining Co., Henderson	6,000	(*)	(*)
East Texas Refining Co., Longview	10,000	7,000	8,000
Gladetex Refining Co., Gladewater	500	400	300
Gladewater Refining Co., Gladewater	1,000	250	400
Guillory Refining Co., Kilgore	200	50	150
V.O.E. Refining Co., Gladewater	500	550	300
Kilgore Refining Co., Kilgore	1,500	850	700
Overton Refining Co., Overton	3,500	900	800
Petroleum Refractionating Co., Longview	10,000	(*)	(*)
Sinclair Refining Co., Camps Switch	5,000	1,200	900
Southern Oil & Refining Co., Kilgore	2,500	450	300
Slack Petroleum Co., Willow Springs	2,500	(*)	(*)
Taylor Refining Co., Tyler	15,000	750	700
Total	79,500	15,300	14,550

*Shut down.

A. P. I. DIVISION MEETINGS ESPECIALLY WELL ATTENDED

Technical and economic problems of the petroleum industry were discussed at length in Tulsa last week during the annual mid-year meetings of the divisions of production, refining and marketing of the American Petroleum Institute which began on June 1 and continued through June 3. Directors of the Institute held several sessions in Tulsa on these days. This was the first time the three divisions of the Institute held their annual mid-year meetings at the same time and place.

Attendance at the meetings was greater than the most optimistic had anticipated and those present included a majority of the key men of the industry, leading executives and engineers reaching Tulsa early in the week and remaining through the sessions.

The board of directors of the Institute elected Charles E. Arnott, president of the Socony-Vacuum Corp.; and F. S. Fales, president of the Standard Oil Co. of New York, as directors to succeed H. B. Earhart, president of the White Star Refining Co., and Charles E. Meyer, who recently resigned as president of the Standard Oil Co. of New York.

The directors petitioned Congress to strike from the federal tax bill all sales taxes and to substitute therein a general manufacturers' excise tax. The board pointed out that in the bill as adopted and since passed the petroleum industry provides nearly 18 per cent of the tax revenue.

The directors adopted a resolution providing that the general committee of the division of refining recommend that the board of directors of the Institute suggest to the National Automobile Chamber of Commerce the organization of a joint committee of executives of the petroleum and automotive industries to study the mutual problem of engine design and fuel properties for the purpose of developing recommendations as to what should be the policy of the two industries from time to time. They also approved the bill introduced in the Senate by Senator Reed imposing upon consignors of liquid fuels the duty of making monthly reports in certain cases to the Bureau of Mines.

Oil Advisors Suggest Further Curtailment In Crude Oil Output

The Oil States Advisory Committee, representing the governors of 10 oil producing states, met in Tulsa on Friday, June 3, and made up a suggested schedule of production for the balance of the year. The committee made a 10 per cent cut in its previous schedule of what it considered should be the allowable production of the United States. Its new schedule is given in the table below:

SUGGESTED U. S. PRODUCTION

	Suggested prod.	Present prod.
Arkansas	41,000	34,000
Louisiana	60,000	54,000
Kansas	117,000	96,000
Oklahoma	515,000	405,000
Texas	730,000	553,000
California	425,000	480,000
Rocky Mountain Fields	45,000	47,000
S. W. New Mexico	45,000	34,000
Eastern Fields	108,000	118,000
Total	2,136,000	2,170,000

In making up its estimate of production requirements for the remainder of the year, to become effective June 21, the committee scaled down its former production allocations 10 per cent each.

The committee has always figured that Oklahoma was not getting its share of the crude oil market, and that Texas was vastly overproducing, but its suggested production figures have never measured with the actual in either Oklahoma or Texas, and they do not in the new schedule. Oklahoma is still far under the allowable set by the committee and Texas is as much over as Oklahoma is under.

Compared with present day production the suggested production for the whole country would require a further general curtailment of only 34,000 bbls. per day.

The committee gives an allowable to Arkansas of 7,000 bbls. a day over its present production; Kansas an increase of 21,000 bbls.; Oklahoma an increase of 107,000 bbls., and southeastern New Mexico an increase of 11,000 bbls., while on the other hand it asks Texas to cut its present production 109,000 bbls. a day, Louisiana is decreased 4,000 bbls., California 55,000 bbls., the Rocky Mountain fields (not including southeastern New Mexico) 2,000 bbls., and the fields east of the Mississippi River 10,000 bbls.

REPRESENTING CONTRACTORS

Luther W. Morefield, formerly assistant superintendent of the Great Lakes Pipe Line Co., is now representing the Cities Construction Co. of Hammond, Ind., pipe line contractors with headquarters in Tulsa.

Late Fields

SOUTHWEST TEXAS

SAN ANTONIO, Tex., June 7.—Magnolia Petroleum Co. has agreed to take 100 bbls. daily from Suttles' No. 1 Bennett, 3-mile extension of Government Wells Pool in Duval County, and Seacord and Putnam's No. 1 Johnson, gas well in shallower sand at 1,574 feet, located a half mile west of Suttle and used to supply fuel to rigs nearby, today started making oil. Allied Gas Co.'s No. 26 Gutierres, in second sand in Escobas Field, at 1,476 feet today came in making 80 bbls. hourly, the biggest well in the field, where normal wells make 100 bbls.

OKLAHOMA

Production from the Oklahoma City Field on June 5 was 85,934 bbls. from 128 wells, on June 6 the production was 73,489 bbls. from 94 wells, and on June 7 the production was 135,440 bbls. from 156 wells.

Eason Oil Co.'s No. 1 Huggins, in Section 1-7-8, Hughes County, found a hole full of water in the Gilcrease sand at 3,010-92 feet, and was shut down.

Empire Oil & Refining Co.'s No. 4 Fish, flowed 235 bbls. of oil in 16 hours, and after a 15-quart shot swabbed 401 bbls. of oil in 20 hours.

Sunbeam Oil Co.'s No. 1 Campbell, in Section 20-9-6, Seminole County, drilling the cement plug at 2,693 feet, and drilled deeper to 2,704 feet, where a showing of oil, gas and water was found.

P. Robb and others' No. 1 Burton, NE cor. SW, Section 31-1s-2w, a semiwildcat test on the south edge of the Tatums Field in Carter County, cored a sand at 1,498-1,536 feet, where a showing of oil was found. It was drilling deeper at 1,735 feet.

Carter Oil Co.'s No. 1 Carson, SE cor. Section 12-3-8w, a wildcat test on a community block in southwestern Grady County, found a showing of oil at 4,468 feet while drilling at 4,480 feet. The initial contract depth was 4,500 feet, but it is expected the test will be drilled deeper. Another showing of gas was found at 2,290-2,311 feet and a showing of oil at 2,712-23 feet. A core showed oil at 3,411-16 feet. The other companies interested in the community block include The Texas Company, Gulf Oil Co. and Magnolia Petroleum Co.

Two locations were announced for the north Sacred Heart Pool, in Pottawatomie County, during the last few days. One is the Hilton Phillips and others' No. 1 in the SW cor SE Section 21-7-4, and the other is H. S. Clarke and others' No. 1 Hinds, NW cor. NE NE Section 28-7-4.

Pure Oil Co.'s No. 1 Tucker, in SE cor. Section 34-7-4, found the Simpson sand at 4,245-68 feet, where it made 116 bbls. in three and one-half hours.

KANSAS

The daily allowable of the Voshell Pool was increased on June 6 from 36 per cent of the potential production to 50 per cent of the potential. The increase in the daily allowable is due to the Sinclair Prairie Oil Marketing Co. nominating 1,500 bbls. a day which was effective June 5. Following is the nominations by companies: Skelly Oil Co., 2,000 bbls.; Derby Oil Co., 1,000 bbls.; Sinclair Prairie Oil Marketing Co., 1,500 bbls.; Shell Petroleum Corp., 800 bbls., and Barnsdall Oil Co., 900 bbls., making a total of 6,200 bbls. daily for the Voshell Pool in McPherson County.

The state umpire announces that arrangements are practically completed to reopen the Stratman area in Ellsworth County, in Township 17-10w, which has been shut in since the Stanolind Crude Oil Purchasing Co. withdrew as a purchaser. The Derby Oil Co. and the Eldorado Refining Co. plan to purchase this oil. The area now has nine completed wells with a potential of 14,047 bbls.

Mid-Kansas Oil & Gas Co.'s No. 1 Sperling, NW cor. NE, Section 28-21-3w, south of the Voshell Pool, in McPherson County, flowed at the rate of 75 bbls. per hour and filled a 250-bbl. tank in a short time and was shut in. The oil production was found in the chat at 3,088-3,142 feet.

Stanolind Oil & Gas Co.'s No. 1 in Section 20-22-3w, in the northwestern part of Harvey County, made 220 bbls. of oil in five and one-half hours from the Hunton lime at a total depth of 3,492 feet.

High Spots in Field News

CALIFORNIA

California expecting higher prices. Only obstacle is failure of some operators to get in line on curtailment.

GULF COAST

Conroe district, Montgomery County, well estimated 1,200 bbls. Two other tests to north being closely watched.

KANSAS

Another Hunton lime producer in Harvey County. Mid-Kansas well, south of Voshell Pool, estimated 75 bbls. an hour.

OKLAHOMA

Flood slowing down production in Seminole. Oklahoma City back to normal. Another good well in Western Osage County.

ROCKY MOUNTAIN AREA

Increased activity in Colorado area. Washington State test spudded. Test in South Dakota. Resumption in LaBarge Field.

NORTH LOUISIANA, ARKANSAS, MISSISSIPPI

Drilling increases in North Louisiana and Arkansas. Several large wildcat blocks being assembled. Three dry holes in Zwolle.

SOUTHWEST TEXAS

Good well in Duval County, estimated at 2,800 bbls. Several new tests near Government Wells Pool. Lee County has important test.

WEST AND NORTH TEXAS

Deep test in unitized operation in Crockett County. Northern Winkler County to get another well. Many new locations in North Texas.

EAST TEXAS

Total of completed wells now over 6,000. There were 155 completed during week and 140 new locations. Joiner Field marker found.

MEASURE TO PERMIT ALCOHOL FROM OIL

WASHINGTON, D. C., June 6.—The House of Representatives today approved a bill that, if enacted before Congress adjourns, will put between 400 and 500 people almost immediately at work in Barnsdall, Okla.

The measure, introduced in the house by Representative W. E. Disney, would amend the present law and permit the manufacture of beverage alcohol in Osage County, now prohibited under the original acts governing Indian Territory.

The Barnsdall Oil Co. has a secret process for the manufacture of alcohol from crude petroleum, but has been prevented from utilizing the process because of the old law. The alcohol would be manufactured under government permits for medicinal purposes.

The Disney bill has had the indorsement of the prohibition bureau, justice department and other governmental authorities.

APPROVES COMPACT

WASHINGTON, D. C., June 7.—The McKeown bill to permit interstate compacts for oil conservation and restrict oil imports was approved today by the house judiciary committee in a 6 to 5 vote.

The bill was amended by the committee to provide that before any conservation compact shall become effective, it must be approved by Congress.

Imports are limited to 5½ per cent of the total estimated demand for consumption within the United States and for export from the United States.

The import limitation would not become effective until Congress by law has approved interstate compacts controlling domestic production.

INSTALL RECOVERY PLANT AT BAYWAY

(Continued from Page 25)

is introduced at the bottom of the tallest tower shown, and the tower at the right of the same group, where it is prepared for the manufacture of hydrogen at the hydrogenation plant at Bayway.

An oil comparable to the commercial grade of furnace oil is pumped to the top of each of these three towers, and thence trickled down through bell-capped plates, where it comes into direct contact with the rising stream of gas, at the same time absorbing the gasoline vapors from the gas stream. The gas is then released from the tops of these towers and thence distributed throughout the refinery yard as fuel and for other more special operations at other units of the Bayway plant.

The oil containing the dissolved gasoline is automatically released from the bottoms of these towers, and pumped through heat exchangers and a steam preheater into the distilling equipment (the two stills shown in the foreground of the accompanying illustration). The still shown on the right receives the preheated oil and operates at approximately 80 pounds pressure.

The fixed gas necessarily absorbed in the three towers, and a relatively small percentage of the lightest components of the gasoline fraction are distilled from the oil in this first still. Following this operation, the oil is released from the bottom of the first still, and introduced into the still at the left, operated at about 5 pounds. A sufficient volume of open steam is used in this low pressure unit to strip the gasoline from the oil completely.

This hot oil, from which all of the gasoline has been taken, is then pumped back through the heat exchangers and is cooled further by indirect contact with water, preparing it to be again pumped to the top of the three towers to absorb further quantities of gasoline from the constantly flowing stream of gases from various sources about the refinery.

Gasoline vapors passing overhead from the two stills are water cooled in the horizontal condensers seen on the second highest platform in the photograph, and the liquid gasoline flows from these condensers into the two vertical drums between the two stills. Gasoline is pumped from both drums to top of the two stills for reflux, in order to insure control of the color and endpoint of the gasoline. The remaining quantity of gasoline from the low pressure still is pumped into the vapor line of the high pressure still, thereby insuring that the total production of the plant is condensed under the higher pressure, thus minimizing the amount of noncondensed gas which must be returned to the absorbing towers.

The total production of gasoline from the unit flows to 10 by 30 horizontal drums (not shown in the accompanying photograph), and is then pumped to the stabilizing tower in another part of the refinery, where the fixed gas is stripped from the gasoline.

Flexibility

A remarkable degree of flexibility characterizes the new unit. The equipment for the plant was designed to permit of possible later expansion, and its flexibility is so great that a single unit of the plant can at any time be by-passed for repairs or metal inspection, without interfering with the operation of the remainder of the plant. In addition, every precaution has been taken to guard against injury to the operators of this new equipment.

Engineers of the New Jersey company have been carefully studying the changing requirements for motor gasoline necessitated by the improved design of automotive power units, with particular reference to the higher compression ratio of new automobile types, and have steadily developed the company's equipment for the production of gasoline of better antiknock quality, greater ease of starting, and rapid acceleratiion. Construction of the new gasoline recovery plant, it is understood, is but the first step in the company's program for further modernising and improving its gasoline manufacturing equipment, although thus far no official information has been forthcoming as to further contemplated construction at Bayway or Bayonne.

NEW FEDERAL TAXES STIMULATES BUYING

(Continued from Page 35)

apply only with respect to the importation of such articles.

Pipe Line Tax

Section 731 provides for a tax upon all transportation of crude petroleum and liquid products thereof by pipe line originating on or after the fifteenth day after the date of the enactment of this act and before July 1, 1934:

"(1) A tax equivalent to 4 per centum of the amount paid on or after the fifteenth day after the date of the enactment of this act for such transportation to be paid by the person furnishing such transportation.

"(2) In case no charge for transportation is made either by reason of ownership of the commodity transported or for any other reason a tax equivalent to 4 per centum of the fair charge for such transportation to be paid by the person furnishing such transportation.

"(3) If (other than in the case of an arm's length transaction) the payment for transportation is less than the fair charge therefor, a tax equivalent to 3 per centum of such fair charge, to be paid by the person furnishing such transportation.

"(b) For the purpose of this section, the fair charge for transportation shall be computed: (1) from actual bona fide rates or tariffs, or (2) if no such rates or tariffs exist, then on the basis of the actual bona fide rates or tariffs of other pipe lines for like service, as determined by the commissioner, or (3) if no such rates or tariffs exist, then on the basis of a reasonable charge for such transportation, as determined by the commissioner.

"(c) Every person liable for the tax imposed under subsection (a) shall make monthly returns under oath in duplicate and pay such taxes to the collector for the district in which is located his principal place of business or, of he has no principal place of business in the United States, then to the collector at Baltimore, Md. Such returns shall contain such information and be made at such times and in such manner as the commissioner, with the approval of the secretary, may by regulations prescribe."

Depletion Clause

Percentage depletion for oil and gas wells follow:

"In the case of oil and gas wells the allowance for depletion shall be 27½ per centum of the gross income from the property during the taxable year, excluding from such gross income an amount equal to any rents or royalties paid or incurred by the taxpayer in respect of the property. Such allowance shall not exceed 50 per centum of the net income of the taxpayer (computed without allowance for depletion) from the property, except that in no case shall the depletion allowance be less than it would be if computed without reference to this paragraph."

"Depletion.—In the case of mines, oil and gas wells, other natural deposits, and timber, a reasonable allowance for depletion and for depreciation of improvements, according to the peculiar conditions in each case; such reasonable allowance in all cases to be made under rules and regulations to be prescribed by the commissioner, with the approval of the secretary. In any case in which it is ascertained as a result of operations or of development work that the recoverable units are greater or less than the prior estimate thereof, then such prior estimate (but not the basis for depletion) shall be revised and the allowance under this subsection for subsequent taxable years shall be based upon such revised estimate. In the case of leases, the deductions shall be equitably apportioned between the lessor and lessee. In the case of property held by one person for life with remainder to another person, the deduction shall be computed as if the life tenant were the absolute owner of the property and shall be allowed to the life tenant. In the case of property held in trust the allowable deduction shall be apportioned between the income beneficiaries and the trustee in accordance with the pertinent provisions of the instrument creating the trust, or, in the absence of such provisions, on the basis of the trust income allocable to each."

"Section 102. Sale of mines and oil or gas wells.

"(a) In the case of a bona fide sale of mines, oil or gas wells, or any interest therein, where the principal value of the property has been demonstrated by prospecting or exploration and discovery work done by the taxpayer, the portion of the tax imposed by Section 12 of this title attributable to such sale shall not exceed 16 per centum of the selling price of such property or interest."

SOVIET USING ELECTRIC CORING

NEW YORK, June 6.—Soviet oil companies, particularly the Azneft, are utilising electric coring on an extensive scale in Russian oil fields, according to reports from Moscow. Electric coring is now being done at all of the wells being drilled by Azneft, it is stated, and its use is spreading. Azneft has ordered that utilization of data obtained from electric coring must bring drilling up to 300 meters per month per rig.

CALIFORNIA CRUDE OIL PRICES

STANDARD OIL CO OF CALIFORNIA
(Effective June 23, 1931)
UNION OIL CO. OF CALIFORNIA
(Effective June 20, 1931)

For current purchases of crude oil at the well (unless otherwise specified) for allowable crude oil produced in accordance with allocations made by the California Statewide Curtailment Committee.
(All gravities above those quoted take highest price offered in that field)

Gravity		Signal Hill	Seal Beach, Alamitos Heights	Huntington Beach	Inglewood	Playa Del Rey	Ollinda-Brea Canon	Athens-Rosecrans Domingues	Torrance	Richfield	Coyote Hills	Santa Fe Springs	Midway-Sunset, Elk Hills Buena Vista Hills	Lost Hills	Santa Paula	Orcutt	Gravity
14-14.9	....	$.65	$.65	$.65	$.65	....	$.65	....	$.65	$.65	$.65	....	$.55	$.55	$.65	$.55	14-14.9
15-15.9	....	.65	.65	.65	.65	....	.65	....	.65	.65	.65	....	.55	.55	.65	.55	15-15.9
16-16.9	....	.65	.65	.65	.65	....	.65	....	.65	.65	.65	....	.55	.55	.65	.55	16-16.9
17-17.9	....	.65	.65	.65	.65	....	.65	....	.65	.65	.65	....	.55	.55	.65	.55	17-17.9
18-18.9	....	.65	.65	.65	.65	....	.65	....	.65	.65	.65	....	.55	.55	.65	.55	18-18.9
19-19.9	....	.65	.65	.65	.65	$.65	.65	....	.65	.65	.65	....	.55	.55	.65	.55	19-19.9
20-20.9	....	.65	.65	.65	.66	.65	.66	....	.65	.65	.65	....	.55	.55	.65	.56	20-20.9
21-21.9	....	.65	.65	.65	.68	.66	.67	....	.65	.66	.65	....	.55	.57	.65	.57	21-21.9
22-22.9	....	.65	.65	*.66	.70	.67	.68	....	.66	.68	.65	....	.56	.59	.65	.59	22-22.9
23-23.9	....	.67	.67	*.68	.72	.68	.70	....	.67	.70	.66	....	.58	.60	.65	.61	23-23.9
24-24.9	....	.69	.69	*.70	.74	.69	.72	$.69	.68	.72	.67	$.65	.61	.62	.66	.63	24-24.9
25-25.9	....	.71	.71	*.72	.76	.70	.74	.71	.70	.74	.69	.65	.64	.64	.68	.65	25-25.9
26-26.9	....	.73	.73	*.74	....	....	.76	.73	....	....	.71	.65	.66	.66	.70	.67	26-26.9
27-27.9	....	.75	.75	*.76	....	....	.78	.75	....	....	.73	.68	.68	.67	.72	....	27-27.9
28-28.9	....	.77	....	....	....	....	.80	.77	....	....	.75	.71	.71	.69	.74	....	28-28.9
29-29.9	....	.79	....	....	....	....	....	.79	....	....	.77	.73	.74	.71	.76	....	29-29.9
30-30.9	....	.81	....	....	....	....	....	.81	....	....	.79	.75	.76	.72	.78	....	30-30.9
31-31.9	....	....	....	....	....	....	....	.83	....	....	....	.78	....	....	....	....	31-31.9
32-32.9	....	....	....	....	....	....	....	.85	....	....	....	.80	....	....	....	....	32-32.9
33-33.9	....	....	....	....	....	....	....	.87	....	....	....	.82	....	....	....	....	33-33.9
34-34.9	....	....	....	....	....	....	....	.89	....	....	....	.85	....	....	....	....	34-34.9
35-35.9	....	....	....	....	....	....	....	....	....	....	....	.87	....	....	....	....	35-35.9
36-36.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	36-36.9

Santa Paula and Orcutt—Posted only by the Union Oil Co.

Playa Del Rey—Subject to a field gathering charge of 3 cents per barrel.

Huntington Beach—Union Oil Co.'s price schedule reads: 14 degrees up to 22.9 degrees, inclusive, 65 cents per barrel; 23-23.9 degrees, 67 cents, with 2 cents added for each degree upward to 27-27.9 degrees, at 75 cents.

Wheeler Ridge—Standard Oil Co. posts 55 cents for all grades.

Coalinga—Standard Oil Co. and Union Oil Co. post 55 cents for all grades up to and including 24-24.9 gravity, and 57 cents for 25 gravity.

Newhall, McKittrick and Kern River—Standard Oil Co. posts 55 cents per barrel for all grades.

McKittrick, Kern River, Midway-Sunset, Elk Hills and Buena Vista Hills—Union Oil Co. pays 50 cents for 11 to 13.9 degrees, and 55 cents for all other grades.

Montebello—Standard Oil Co. and Union Oil Co. post 65 cents per barrel for all grades.

Whittier and La Habra—Standard Oil Co. posts 65 cents per barrel for all grades.

Elwood Terrace—Standard Oil Co. posts: 23-23.9 degrees, 79 cents; 24-24.9 degrees, 81 cents; 25-25.9 degrees, 84 cents; 26-26.9 degrees, 87 cents. All prices f.o.b. ship.

Santa Fe Springs—Union Oil Co.'s top price is 85 cents per barrel for 34-34.9 gravity.

Coalinga—By the Union Oil Co., effective May 17, 1932: 11 to 13.9 degrees, 50 cents; 14 to 24.9 degrees, 55 cents; 25 to 25.9 degrees, 57 cents.

ASSOCIATED OIL CO PRICES

Associated Oil Co. prices effective June 20, 1931, are as follows:

Ventura Avenue—22 gravity, 58 cents, with 2 cents added for each degree upward to and including 30 gravity, which is 74 cents.

Kettleman Hills—The Associated Oil Co., effective at 7 a.m., February 8, 1932, withdrew and canceled any and all prices heretofore published and in effect for Kettleman Hills oil.

Potrero—24 gravity, 49 cents, with 2 cents added for each degree upward to 34 gravity which is 69 cents.

Coalinga (effective May 24, 1932)—11 to 13.9 gravity, 50 cents; 14 to 24.9 gravity, 55 cents; 25 gravity and above, 57 cents.

General Petroleum Co. in Kettleman Hills, effective January 1, 1933: 33-33.9°, 66 cents; 34-34.9°, 68 cents; 35-35.9°, 70 cents; 36-36.9°, 72 cents; 37-37.9°, 74 cents; 38-38.9°, 76 cents; 39-39.9°, 78 cents.

Production Policies and Practices

New Conception of Laws and Recently Developed Technique in Oil Industry Problems Discussed by Attorneys and Engineers

By L. G. E. Bignell
Petroleum Engineering Editor

The mid-year meetings of the American Petroleum Institute held in Tulsa, really started on Monday, May 30, with deliberations of the committee on refinery statistics and economics which carried over to May 31. On Wednesday, June 1, there were many meetings of standardization committees and these were carried on through the three days during which many important details were handled.

The central committee on district activities under Chairman Walter H. Meier, Atlantic Oil Producing Co., Dallas, Tex., had a noonday luncheon meeting on June 1 which was attended by about 25 members from all of the various districts and chapters. There are four districts in the production division, California, Southwestern, Mid-Continent and Eastern and they report that five meetings in all were held during the past year and a large number of problems, most of them common to the district in which the meeting was held, were discussed.

There were 45 chapter meetings with attendance varying from 50 to 300. Many of them have been reported in the Institute's Quarterly.

A new chapter was organized in the Panhandle of Texas with headquarters at Pampa, and another in Wichita, Kans.

Mr. Meier reports that much real progress has been made in building up institute activities in the communities where they have chapters and he feels that now that the machinery is in full operation for the presentation and discussion of any policies or concrete recommendations which may be beneficial to the members of the A.P.I., added progress will be made.

The production division's technical sessions were divided into three general meetings, one on well spacing, a second on rotary drilling fluids and the third upon the effect of proration on ultimate recovery.

Because of the fact that the well spacing meeting was in the nature of preliminary reports by various members on different phases of this problem only one prepared paper was presented. It has, therefore, been necessary to make a report of this meeting from notes and that report will be found elsewhere in this issue of The Oil and Gas Journal.

Production policies were discussed at a meeting over which Charles F. Roeser, of Roeser & Pendleton, Inc., Fort Worth, Tex., presided and Dr. F. H. Lahee, Sun Oil Co., Dallas, Tex., presented a paper on "Geology and the New Conception in Pool Development," printed in last week's Oil and Gas Journal.

A paper on "Laws Affecting Production in Principal Producing States," was presented by John Kilgore, of Kilgore and Rogers, attorneys, Wichita Falls, Tex. Mr. Kilgore said, in part:

"Time demands that my subject be greatly restricted. In confining myself to the laws of Oklahoma, California, Kansas and Texas, I mean no discourtesy to the other producing states. In discussing only conservation laws, I do not mean to imply that they are the only ones which affect production.

Varying Conservation Laws

"The best conservation law is one that, in the broadest terms, defines and condemns waste; that provides the speediest method of determining the practices that come within its prohibitions; that provides the quickest determination by the courts of the validity of orders of the administrative agency; and that provides the surest adequate penalties for willful violation.

"The main differences, then, in the conservation laws of the four states named are the differences in the definitions of waste, differences in administration, differences in penalties. For example: In Oklahoma the definition of waste includes economic waste, while in Texas the definition of waste expressly excludes it. Another fundamental difference between the laws arises from the difference in underlying rules of property. As applied to oil and gas in place, the rule of property in Texas is that the fee owner of land owns absolutely everything below the surface. If a well is drilled on my land, the presumption is that all oil and gas produced from that well comes from beneath my land. My neighbor has only one remedy to protect his land from drainage through my well, and that remedy is to drill on his land as close to the dividing land as I have been permitted to drill. In Oklahoma the fee owner of the surface owns only the right to produce through his well his ratable share of all oil from the underlying pool, based on the proportion of the total acreage overlying the pool. The pool of oil and the right to take therefrom is the common property of all surface owners.

"Kansas has the same property rules as Texas. California is not unequivocally committed to either, leaning, however, toward the Texas rule, but in spite of this rule of property in Kansas, its legislature has passed a ratable withdrawal act. Whether or not this act is constitutional being in violation of the rule of property established in the State, has not yet, to my knowledge, been passed upon by its courts.

"The Oklahoma rule lends itself more readily to equitable and effective proration, but true conservation and proration are not always synonymous."

Mr. Kilgore then went on to analyze these various state laws and concluded with:

"In brief, it is my opinion that we will accomplish better and more equitable results in our conservation laws if we seek to accomplish conservation through the control and use of forces of nature which are necessary to the production of oil. This would be a matter of simple justice to all interests because, so far as I know, no court has yet held that any individual has an exclusive property right in these forces of nature."

Court Sees a Demonstration

Mr. Roeser in addressing the meeting and commenting upon the changing order of things stated in part that the work that has been done by the petroleum engineer and geologist is now being put to use in establishing property rights before various courts. He mentioned the suit before the Federal Court in Houston last week where a model of the sand conditions in the East Texas Pool was exhibited and a demonstration made that showed the judges quite conclusively what might happen in that pool under different rates of production.

The model used was about 4 feet long, 2 feet high and 2 feet wide with a glass front and the box filled with East Texas oil sand in such a manner as to present zones or areas of different porosity and permeability. Over the top of the sand, which was placed in the box on about the same dip to the west as actually exists in this field, there was placed a body of shale to make a seal.

The sand was filled with oil and the box provided with an inlet and outlet into the producing horizon. Water was admitted from a 5-gallon bottle placed at an elevation above the model to set a hydrostatic head on the sand similar to that existing in the East Texas Pool.

In making the first demonstration the valve controlling the inflow of water into the sand was opened only enough to permit water to enter at a slow rate and it was shown at this controlled rate the oil was driven up dip and out of the sand and withdrawn from the outlet valve placed at the right side of the model. The difference in sand porosity and permeability was made evident by the movement of the water and under the best conditions some oil was trapped in the sand by the water, even though the recovery of oil was high.

After this demonstration had been made the attorneys for the plaintiff asked that it be repeated by allowing the water to enter the sand at high rate to test their contention that under high rate of production more oil would be recovered from the pool. After recharging the sands with oil and making conditions the same they were in the first test, except placing the water bottle at a higher elevation to give more rapid flow, the test was made.

Under this second condition it was found that over twice the amount of oil was trapped in the sand that had been left there by the controlled production rate condition.

This kind of work, taking to the courts actual evidence of petroleum engineering is considered by Mr. Roeser as very important to the industry for it is breaking down old antiquated ideas of conditions in oil pools and establishing facts as to conditions as now conceived to exist in our oil and gas reservoirs.

Mr. Roeser said that in his opinion if all of our oil fields were now produced in strict accordance with the known best petroleum engineering principles there would not exist any surplus of oil, in fact it might develop that an actual shortage exists today.

Drilling Practice

On Friday morning the production division meeting was devoted to a discussion of rotary drilling fluids with H. A. Marsh, Associated Oil Co., Los Angeles, Calif., presiding in the absence of J. R. Gignoux.

Three papers by A. C. Rubel, Union Oil Co. of California, Los Angeles, Calif.; Stanley Gill, consulting engineer, Houston, Tex., and C. P. Parsons, Halliburton Oil Well Cementing Co., Duncan, Okla., were read and discussed.

This symposium developed many interesting facts but it was apparent that local conditions in the several areas under consideration lent local color to the problems and the authors had therefore been inclined to view the general problem from the light of their own experience. It was therefore suggested that there still remains considerable work for the committee to determine basic facts concerning mud fluids that will have application in all areas. This work will be followed up and further reports made at subsequent meetings of the Institute.

Hu. M. Harris, Humble Oil & Refining Co., San Antonio, Tex., presented a very interesting paper upon "Recent Improvements in Oil Field Boiler Designs" to show the latest developments in this type of equipment.

The features of oil field boiler design determined by recognized boiler codes tend to give similarity to boilers of any one class; but other features, particularly concerning the fire box, flues, mud rings, siphons, and superheat equipment, allow considerable latitude for variations in efficiencies and desirable construction.

The open-bottom large fire boxes, and the short and properly spaced tubes have added to the efficiency, have cut down on the weight, and have made the boilers more adaptable to varying feed waters and firing conditions.

The outstanding trend in the design of oil field boilers is to simulate the design of the railway-type boiler for greater efficiencies and higher working pressures. The most notable points of simulation are the open-bottom fire box, flanged collar on dome, siphons and superheaters.

Production Practice

Friday afternoon session, presided over by Harvey Hardison, The California Co., Dallas, Tex., dealt with papers on effect of ratable production on ultimate recovery of oil from various pools. Four papers were presented.

"Effect of Ratable Production on Ultimate Recovery," by E. V. Foran, consulting engineer, Fort Worth, Tex., was printed in The Oil and Gas Journal, June 2. Due to the absence of Mr. Foran from the meeting, H. D. Wilde, Jr., Humble Oil & Refining Co., Houston, Tex., read the paper.

Mr. Wilde read a paper of his own on "Why Measure Bottom Hole Pressures?" which was followed by a paper prepared by engineers and geologists for the Phillips Petroleum Co., Bartlesville, Okla., and read by D. R. Knowlton, on "Drilling and Production Practice in the Oklahoma City Pool."

The fourth and last technical paper for the session was one by C. L. Moore, Chanslor-Canfield Midway Oil Co., Los Angeles, Calif., on "Operation of Small Wells in California."

In discussing papers in the afternoon session, it was suggested that the term "bottom hole pressure" is a misnomer, because the pressures are not always taken at the bottom of the hole. "Subsurface pressures" was suggested as a substitute term, but others seemed to think that in mapping pressures the lines connecting points of equal pressures might be referred to as "contour lines" without confusion with the term as used by geologists.

It was agreed by all that instrument readings of pressures in holes will be of much benefit to the petroleum and production engineer of the future and whatever these pressures may be called will not make much difference as to their use. Data are rapidly being accumulated in various fields by the use of pressure gauges and studies of these data reveal many interesting facts that have a direct bearing upon producing conditions in the field.

It was stated that in the East Texas Field, when the well pressure opposite the producing horizon reaches 700 to 750 pounds, the methane gas will come out of solution and the wells will have to be pumped. It was predicted that this condition might be arrived at in some areas along the east edge of the field in the not far distant future, and for this reason it is quite essential that records in those wells, also those wells in other parts of the field, should be closely kept to give the operators complete information about conditions there.

Everyone in attendance, and it was estimated that between 500 and 600 men came to the meetings from all parts of the country, gained much additional information on the subjects in which they were interested and the meeting was therefore a pronounced success. Next will be the annual meeting in Houston in November.

Data on Wilcox Sand at Oklahoma City

Production From This Horizon to Date Averages 133,462 Bbls. per Well. Large Ultimate Recovery Is Predicted

By D. R. Knowlton, H. C. Charles and D. A. McGee
Phillips Petroleum Co.*

The oil in the Oklahoma City Field is found in a pronounced faulted anticlinal fold. Structurally the field has a close resemblance to the typical Granite Ridge Pool, such as Eldorado and Oxford in Kansas and Blackwell, Garber and Marshall in Oklahoma. The Oklahoma City Pool differs from those structures in that it has a large number of very prolific oil and gas bearing zones. As shown on the west-east generalized cross section of the field (Figure 1), there are six pre-Pennsylvanian major oil and gas producing horizons. These, in ascending order, stratigraphically, are Arbuckle limestone, Johnson sand, Hammer Haindl sand, School Land sand, and Wilcox sand. Sands from the Johnson to the Wilcox, inclusive, are a part of the Simpson group. For convenience the field is generally separated into three producing zones, namely, Arbuckle limestone, lower Simpson and Wilcox sand. As shown on Figure 1, the term lower Simpson actually includes four distinct and separate oil and gas sands which because of operating practice and similarity in production are generally considered as a single producing unit. Of the six producing horizons in the field, the Wilcox sand to which the following discussion is confined is by far the most prolific.

Post-Mississippian truncation of the structure left the lower Simpson and Wilcox sands exposed in concentric bands of varying width around a core of older Arbuckle limestone. The Wilcox sand, being the youngest of the Simpson group, is farthest removed from the crest of the fold. The bands terminate abruptly at the fault which limits the structure on the east (Figure 2). Following this peneplanation of the fold, impervious Pennsylvanian sediments were laid down unconformably over the upturned ends of the eroded pre-Pennsylvanian beds.

Wedge Shaped Body of Sand

As shown by Figure 1, the oil and gas in the Wilcox are trapped in a wedge-shaped body of sand, the thin edge of the wedge being nearest the crest of the fold. The overlapping Pennsylvanian beds form a fluid tight seal above, while 70 feet of impervious green shale separates the Wilcox from the next producing sand below. Due to the relatively low dips on the base of the Pennsylvanian beds, the Wilcox sand is encountered at approximately the same depths (6,200 to 6,500 feet), as the stratigraphically lower producing sands closer to the top of the structure. The productive zone in the Wilcox sand varies from a maximum width of 1½ miles in the north end of the field, where the dips are low, to a minimum of one-fourth mile in the south end of the field where the dips are steep. The highest point on the base of the Wilcox sand in the north end of the field is approximately 100 feet higher than the highest point in the south end of the field, due to a southward tilting of the structure.

The Wilcox sand has an average thickness when present in complete section of 220 feet. The upper 20 to 30 feet of the sand has large, rounded grains intermixed in a matrix of medium sized, subrounded grains. From these coarse grains to within 10 to 20 feet of the base, the sand is remarkably uniform, well assorted and free from shale partings and other impurities. The basal 10 to 20 feet of the sand has thin partings of light green shale. As a whole it is very loosely bonded, frequently the only material holding the grains together being the oil contained in the voids. Tests made on cores of the Wilcox show that the sand disintegrates into a mass of loose grains when the oil is withdrawn from the pore space. Porosity tests taken on Wilcox sand range from 23 to 32 per cent with a probable average of 27 per cent.

Due to erosion, the Wilcox is not present in complete thickness over most of the area. The 359 wells which have encountered Wilcox sand have penetrated an average of 103 feet. The maximum penetration on record is 262 feet drilled in Phillips Petroleum Co.'s No. 1 Clayton; however, the section in this well was abnormal. The maximum normal section drilled is 226 feet. The 282 Wilcox wells north of the south line of Section 15, which hereafter will be referred to as in the north area, have an average sand penetration of 111 feet, while the 77 wells in the area south of Section 15 have an average penetration of 76 feet.

Other factors being equal, the initial production of a well in the Wilcox sand in the Oklahoma City Field is controlled by the penetration up to a certain limit. Beyond this point, the drilling of additional sand does not materially increase the production of the well. The limiting thickness of sand varies with the size of the casing through which the well is flowing.

Larger Wells in North Area

There is a greater volume of oil saturated sand above the water level in the north area, due to structural position and lower dips. For this reason and possibly because of a more homogenous sand body the north area yields much larger wells initially and undoubtedly will prove to be the more prolific area ultimately. Figure 3 shows the area and thickness of oil-saturated Wilcox sand above the original water level which was determined to be slightly below 5,400 feet subsea by one of the first wells to produce from the Wilcox sand.

As will be noted on the sand thickness map, the thicknesses of sand present in the S half of the SE Section 15, NE Section 22, and the area around the center of Section 26, are not as great as would normally be expected. Wells drilled in these areas show that erosion at the top has materially reduced the thickness of Wilcox sand. The thickness of sand removed ranges from 20 to as much as 80 feet. That these erosional features are restricted and local in character is shown by the fact that in the SE of Section 22, adjoining the eroded area, normal thicknesses of Wilcox sand are encountered and there is no evidence of excessive erosion. It is difficult to explain why the Wilcox sand in the southwest part of the field should have these localized erosional low places when the north and south parts of the field show no similar feature. Figure 4 shows the relation of the topography on the erosion surface to the structural attitude of the Wilcox sand.

Water Encroachment

On May 15, 249 wells in the Oklahoma City Field had shown water. Of this number, 107 were in the Arbuckle limestone zone, 126 in the lower Simpson zone and 16 in the Wilcox sand zone. Of the 107 producing wells originally drilled in the Arbuckle limestone area all have shown water. Of the 126 wells that have shown water in the lower Simpson, 117 are Johnson sand wells, the lowest producing horizon in the Simpson group.

Five of the 16 Wilcox sand wells that have shown water were edge wells and were dry and abandoned. Five others were low structurally and either showed water on their initial gauge or soon after. Three were wells near the thin, inner edge of the Wilcox zone that drilled through the Wilcox sand to the School Land sand below. These three wells, although the Wilcox sand is open in the hole, are making water from the lower Simpson sands. The remaining three wells are near the outer limits of production and showed water soon after completion. Figure 2 shows the areas affected by water with the encroachment shown chronologically by six-month periods.

The 11 producing Wilcox sand oil wells that have shown water are 3 per cent of the total number of wells producing from this zone. The calculated 24-hour potential of the seven water wells now producing from this zone is 68,036 bbls. which is only .8 of 1 per cent of the total potential of the Wilcox area.

On June 12, 1930, Sinclair Oil & Gas Co.'s No. 2 School Land 67, an edge well in the Wilcox sand in the south end of the field was completed with a salt water content of approximately 35 per cent. This was the first salt water encountered in the Wilcox sand and afforded an accurate determination of the original water level. This was only two and one-half months after the first Wilcox sand production had been found in the I.T.I.O.'s No. 1 Mary Sudik, which blew out while drilling and became famous as the first of the wild wells of the Oklahoma City Field. The original water level was calculated to be at 5,425 feet below sea level.

From time to time other wells low structurally have been completed, which either showed water initially or have since started cutting so that an accurate record of the rise of the water level is available. The water level at the present time is approximately 5,356 feet below sea level. This represents an average vertical rise of about 3 feet per month.

Due to the uniform texture, the shape of the sand body and the slow withdrawal of oil, water encroachment in the Wilcox sand up to the present time has been very uniform. The wedge-shaped body of sand, sealed at the top and the inner edge, presents ideal conditions for a complete and efficient flushing of the oil contained. Water encroachment can occur only as an edgewater drive up the dip except in those areas where water is permitted to enter the Wilcox sand through combination wells which have both Wilcox and lower Simpson sands exposed in the same hole. When water appears in these combination wells, the Wilcox sand, since it is separated from the sands below by impervious shale, can and will be protected by plugging off the lower Simpson sands.

Production Practices

In the Wilcox area in the Oklahoma City Field the general practice is to set 6⅝ or 7-inch casing as a flow string on top of the Wilcox sand at approximately 6,300 feet. Twenty wells have set 9⅝-inch flow strings on top of the Wilcox and in a few instances strings of 5 7/16-inch casing have been used. The present method of taking potentials is to obtain a four-hour continuous test of the well soon after its completion. This gauge times six gives the theoretical 24-hour potential of the well. The present allowable is approximately two-thirds of 1 per cent of this potential plus a 25-bbl. flat allowable per well. Due to this method of proration in the field, it is necessary, in order to produce a maximum amount of oil, to obtain the largest potential possible at the designated intervals, which at the present time are semiannually.

It has been definitely determined that

*Presented at midyear meeting A.P.I., Division of Production, Tulsa, June, 1932.

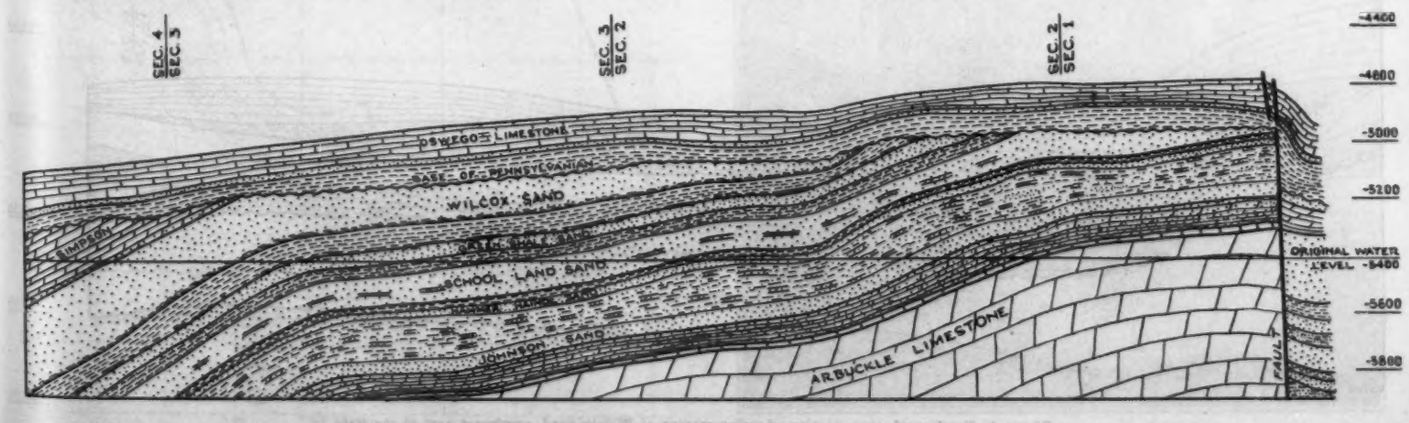


Figure 1—West-east cross section Oklahoma City Field. Generalized. Showing attitude of pre-Pennsylvanian producing horizons.

the potentials in the prolific area in the Wilcox are limited by the diameter of the flow string. This condition is dependent on various factors such as thickness of sand, porosity, and position of the well on the structure. As long as the present proration rules are in effect the operator cannot afford to limit potential and consequent allowable by using screen pipe, tubing, or bottom hole chokes to improve production methods or lower gas oil ratios. The field is consequently not being produced under the most ideal conditions from a gas energy standpoint. This condition could not be entirely corrected unless withdrawals were made only from certain wells favorably located structurally which could be accomplished solely by some unit operation plan. The condition, however, could be improved by the elimination of periodic open flow potentials which would enable the operator to equip wells so as to reduce the gas-oil ratio to a minimum. Proper surface choking between potential periods has realised a large saving in gas energy but is not as effective as a carefully studied tubing program with bottom hole chokes.

Bottom Hole Pressures Declining

The limited amount of data available show the bottom hole pressures are declining uniformly over the Wilcox sand area. Wells on the western edge near water show a bottom hole pressure of 2,056 pounds corrected to a subsea depth of 5,400 feet, while wells on the eastern fringe show 2,023 pounds bottom hole pressure. This small variation over a wide area indicates the pressures within the reservoir adjust themselves rapidly due to the slow rate of withdrawals. This means that little of the oil will be trapped in the sand and the edgewater drive will be very efficient with a consequent high ultimate yield. The above mentioned gas wastage will not to any great extent cut down the ultimate yield as long as the bottom hole pressures remain locally uniform. It does, however, mean the wells will have a shorter flowing life and more expense will be involved in bringing the oil to the surface.

The experience of the Phillips Petroleum Co. in its No. 1 Burt shows that plugging is not necessary in the Wilcox sand in order to effectively produce the oil from a well which actually has the water level above the bottom of the hole. This well was drilled near the western edge of the Wilcox sand close to edgewater. It produced only 19,000 bbls. of oil before water started showing through a 1¼-inch choke against 510 pounds back pressure. The well was gradually pinched back until it was found it would produce no water through a three-eighths inch choke at the rate of 21 bbls. per hour, although it would produce 12 per cent water through a half-inch choke. This well has produced 102,600 bbls. of oil free from water since the appearance of water April 18, 1931. While the well was shut in a sample was taken 15 feet below the top of the sand which showed clear salt water. This indicates these Wilcox wells can probably be produced under proper rates of flow until the edgewater has risen to a point only a few feet below the top of the sand.

Large volumes of sand have been produced from many of the wells in the Wilcox area. As much as 700 bbls. per hour or totals from 4,000 to 5,000 bbls. per well are not uncommon. In one well which was producing from 95 feet of Wilcox sand, the volume of sand removed from the well would leave a hole in the producing formation, if the hole is assumed to be cylindrical, slightly over 21 feet in diameter and 95 feet in length. However, recent tests have shown that in practically all cases where wells have produced large volumes of sand, only a few feet of hole is open below the casing. These adjustments within the sand body have increased the drainage area as shown by a pronounced increase in production in every well that has made sand. The experience on the above mentioned Burt well indicates that these large volumes of sand that have been produced with the oil will have little or no effect on the future production problems, as control of water can be accomplished by proper back pressures, or better yet, by proper-sized tubing.

Extent and Development

The Wilcox sand area at Oklahoma City is unquestionably the best producing field of any appreciable size that has ever been developed in Oklahoma. This part of the Oklahoma City Field may well be classified as a separate and distinct area. As previously set out, this sand is separated from the lower Simpson zone by impervious shale.

The total estimated productive area of the Wilcox sand is 5,250 acres or 41 per cent of the total productive area of the field. Of the total estimated productive acreage in the Wilcox zone, 3,450 acres are within the corporate limits of Oklahoma City. Of the area within the city limits, 1,700 acres or 49 per cent are in the U-7 zone—that part of the city open to drilling. The remaining 1,750 acres of the area within the city limits underlie a closely built up residential section in which drilling is prohibited. This part that cannot be drilled is 33 per cent of the entire area estimated to be productive in the Wilcox sand. This leaves 3,500 acres open to drilling of which approximately 2,460 acres or 70 per cent have been developed. Of the developed area 1,710 acres are in the north area and 750 acres are in the south area.

On May 1, 359 wells had drilled into or through the Wilcox sand. Thirteen of these wells were low structurally. Ten of the 13 were dry and abandoned with water in the Wilcox sand; two were plugged back to the upper Simpson; and one was plugged back to an unconformity sand at the base of the Pennsylvanian. Six more wells located near the edge of the structure either showed water initially or soon thereafter, and one of these wells plugged back to the Pennsylvanian. Thus of the 359 wells completed and tested, only 3.9 per cent have been dry and abandoned or plugged back to horizons above the Wilcox sand.

Three hundred forty-six wells have produced from the Wilcox sand. They have an average initial production, calculated on a 24-hour rate basis, of 30,151 bbls. per well. Two hundred seventy-four of these wells are in the north area and have an average initial production of 34,308 bbls. per well, while 72 wells in the south area have an average initial production of 16,007 bbls. A number of exceptionally large wells have been completed, 50,000 and 60,000-bbl. wells being common. The Phillips Petroleum Co.'s No. 1 McBeth, the largest well on record, produced for two hours and 15 minutes at the rate of 101,002 bbls. daily. The gas volume gauged 67,000,000 cubic feet. The average initial gas volume per well for the 346 wells is approximately 40,000,000 cubic feet per day.

Recoveries to Date

Up to May 1 the total recovery of oil from the Wilcox sand was 45,110,417 bbls., an average of 133,462 bbls. per well. The recovery on the above date per well in the north area was 136,808 bbls., while in the south end it was 120,880 bbls. per well. For the 2,460 developed acres the average production per acre was 18,337 bbls. The north area had produced 21,361 bbls. per acre, and the south area 11,443 bbls. The average elapsed time from the date of completion to May 1 for the 346 producing wells, not including the 65-day proration shut-down period, is 11.7 months.

As an example of recoveries in parts of the field, W half of NW of Section 2 has already produced 9,049,094 bbls., or 113,000 bbls. per acre. This section

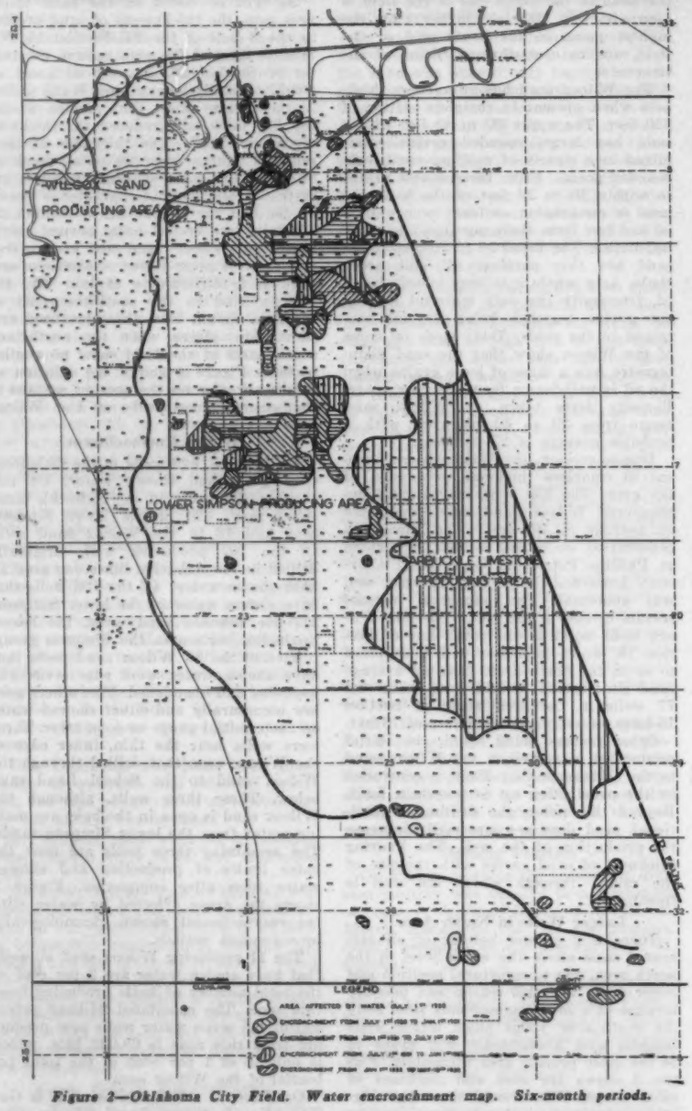


Figure 2—Oklahoma City Field. Water encroachment map. Six-month periods.

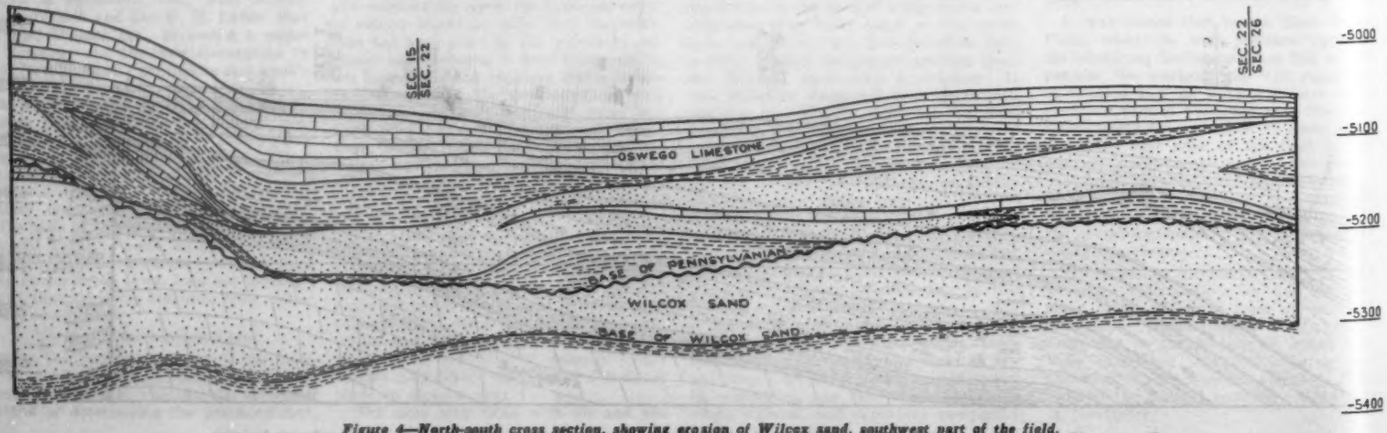


Figure 4—North-south cross section, showing erosion of Wilcox sand, southwest part of the field.

was the first to be developed in the north Wilcox area. There are 32 wells producing on this 80-acre lease. The average sand thickness is 95 feet, which gives the entire 80 acres a recovery to date of 1,188 bbls. per acre foot of sand. The total potential production of all the wells at the present time is calculated to be 1,294,000 bbls. on a 24-hour basis. This is an average of more than 40,000 bbls. per well, while the initial production average is only 44,000 bbls. Already the average well has produced a total of 283,000 bbls. while many of the first wells drilled have produced more than 400,000 bbls.

The sand thickness map (Figure 3) brings out in detail the sand thickness and volume of pay sand which was either encountered or could have been penetrated. The total volume of oil saturated sand above the original water level, which was assumed to be 5,400 feet subsea, amounts to 440,000 acre feet. This does not include 1,750 acres within the city limits upon which drilling is not permitted. Of the total acre feet of sand 64 per cent is in the north area and 36 per cent in the south area.

Future Recoveries

Production methods necessitated by the stringent curtailment of production under the proration schedule, the variation of the chokes through which wells are producing, and changes in reservoir conditions while wells are shut in between flow periods, make impossible the use of production decline curves for estimating ultimate yields in the Oklahoma City Field. The next best method then would be an accurate computation of total sand volume and an estimated per acre foot yield. Data obtained from other Wilcox sand pools in the state indicate that a wide variance exists between these older fields. There are Wilcox sand pools that show an acre foot recovery as high as 1,500 to 1,600 bbls., the St. Louis Pool for example which has already produced as much as this. The Seminole City Pool will undoubtedly yield over 1,000 bbls. per acre foot. There are individual leases within this pool that have had a recovery up to 2,500 bbls. per acre foot.

Owing to the fact that bottom hole pressures are equalized and that water encroachment can be controlled, together with a slow and constant rate of production it would seem only just to allow a 1,000-bbl. per acre foot recovery to the north area and 600 bbls. to the south area. This would give an ultimate yield of 376,000,000 bbls. or an average of 850 bbls. per acre foot to the entire zone. Since the sand has proven to be so regular and homogeneous over most part of the area, yielding wells so remarkably uniform in size, and since no allowance has been made for the vast amount of oil saturated sand under the city that will not be drilled, this figure appears to be fair and conservative.

The total cost of drilling and equipping a well at Oklahoma City, including lease hold cost, is estimated at $160,000. Deducting royalties and allowing for the present selling price of oil to prevail over the life of the property, then each well will need to produce 200,000 gross barrels to pay out the original investment. Not over a maximum of 500 wells will eventually be drilled in the entire zone, which at the estimated ultimate recovery will average 752,000 bbls. per well.

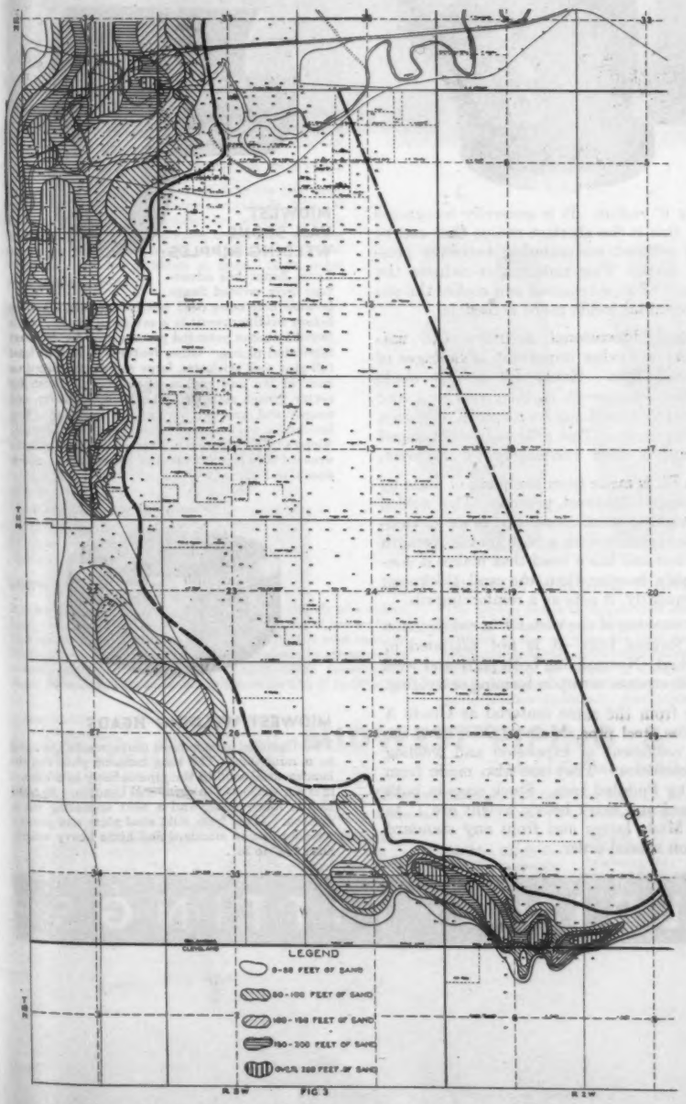


Figure 3—Oklahoma City Field. Thickness of Wilcox sand above water level.

STEADY INCREASE IN DRILLING IN FIRST FIVE MONTHS OF 1932

Spring weather and better prices for crude oil have been a boon to the rig and reel manufacturer and to the makers of drilling equipment and materials entering into the production of oil.

At the close of March there were 748 rigs up and 1,883 wells drilling east of California, a total of 2,631 operations. At the close of May there were 858 rigs up and 2,284 wells drilling a total of 3,142 operations. Thus in two months there was an increase of 110 in rigs up and an increase of 401 in wells drilling, a total increase of 501 operations. On top of this increase in field work was an average of 165 in completed wells.

Going back to the first of the year and checking up the number of new operations started in the first five months we find the following: January 892, February 910, March 968, April 1,442 and May 1,493. The number of completions by the month were: January 928, February 885, March 962, April 1,132 and May 1,292.

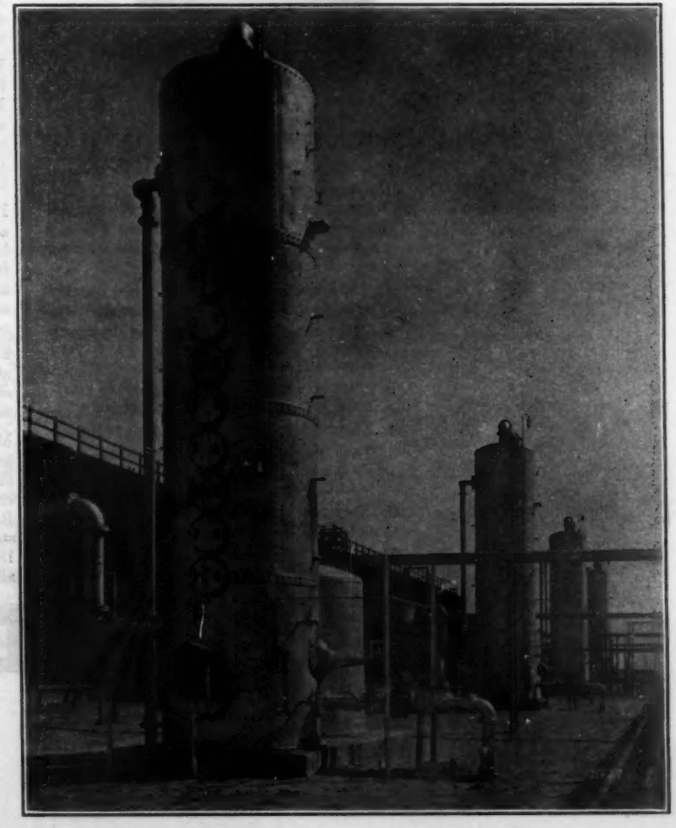
Comparing figures of May with April it is seen that practically all of the increased field work was in areas where big wells are not to be expected. Under the stimulus of better crude oil prices it has been deemed good business to develop old leases where relatively small, but paying production might be expected. Only nine more operations were recorded in the East Central and East Texas fields compared to the status at the close of April, and there was an actual decline of nine operations in the big West Texas Field and of 10 in the Gulf Coast Field. The big gains in field work were in the old Eastern or Pennsylvania Grade fields, Kansas, Oklahoma and North Louisiana. In the Eastern fields the increase was 32 operations, Kansas 47, Oklahoma 66, Southwest Texas 12, Texas Panhandle 12, East Central and East Texas 9, North Louisiana 35, North Central Texas 3, Montana 2, Wyoming 3, and New Mexico 6. Decreases in field work were noted in Central Ohio, where the falling off was 7, Lima 3, Michigan 1, Illinois 1, East Texas gas field 3, West Texas 9, Gulf Coast 10, Arkansas 4, and Mississippi 1.

SUMMARY OF ALL FIELDS
WELLS COMPLETED

Field—	Comp.	Prod.	Dry	Gas
Eastern	124	483	16	23
Central Ohio	29	112	8	15
Lima	15	57	5	4
Kentucky	37	1,435	13	5
Indiana	13	332	6	2
Michigan	14	12,495	3	0
Illinois	2	22	0	0
Kansas	35	16,643	18	0
Oklahoma	89	63,624	29	6
N. Central Texas	123	3,734	52	10
West Texas	23	2,640	6	0
Texas Panhandle	9	915	1	2
E. Cen. and E. Tex.	601	44,192	14	1
E. Texas gas field	6	0	6	0
Southwest Texas	61	7,780	36	2
Gulf Coast	75	26,664	32	1
North Louisiana	20	3,281	5	3
Arkansas	3	0	3	0
Montana	3	1,350	1	0
Wyoming	2	203	0	0
Colorado	2	0	2	0
New Mexico	4	1,530	1	0
Mississippi	2	0	1	1
Total May	1,292	187,492	258	77
Total April	1,132	168,732	282	81
Difference	160	18,760	24	4

RIGS AND WELLS DRILLING

	Rigs	Drlg.	Ttl.
Eastern	48	161	209
Central Ohio	17	65	82
Lima	3	22	25
Kentucky	10	73	83
Tennessee	0	14	14
Indiana	3	63	66
Michigan	59	72	131
Illinois	1	20	21
Mississippi	1	16	17
Alabama	2	2	4
Missouri	0	1	1
Kansas	56	143	199
Oklahoma	113	322	435
N. Central Texas	44	154	198
West Texas	13	100	113
Texas Panhandle	12	53	65
E. Cen. and E. Texas	316	400	716
E. Texas gas field	3	28	31
Southwest Texas	31	119	150
Gulf Coast	7	116	123
North Louisiana	58	64	122
Arkansas	7	29	36
Montana	17	50	67
Wyoming	16	62	78
Colorado	10	67	77
New Mexico	10	49	59
Utah	1	19	20
Total May	858	2,284	3,142
Total April	807	2,134	2,941
Difference	51	150	201



Line of absorbers in the McCamey, Tex., gasoline plant of the Phillips Petroleum Co.

Wherever piping is welded . . .

THESE FITTINGS IMPROVE

MIDWEST WELDING ELLS—90° and 45°

The dotted lines indicate the *longer tangents* provided only on Midwest Welding Ells. Tangent length is one-quarter of nominal fitting diameter: a 12" Midwest Ell has tangents 3" long. Advantages of these longer tangents are:

1. They make it possible to more quickly and accurately line up the pipe and fitting.
2. They make it easier to use lining-up clamps than when fittings have very short tangents or none at all.
3. They remove the weld from point of maximum bending stress (the end of the arc).
4. They reduce the amount of pipe required.
5. They frequently eliminate the use of a short nipple and the extra circumferential weld it requires.
6. They make it possible to slip on forged steel flanges and weld them front and back.

The radius of every Midwest Welding Ell is 1½ times the nominal diameter: a 4" Ell has a 6" radius. It is generally recognized that this is the shortest radius that can be used without encountering excessive pressure drop. This radius also reduces the amount of pipe required and makes the circumferential welds more accessible.

Unusual dimensional accuracy and uniformity are other important advantages of Midwest Ells. Every Ell is first made slightly *oversize*—it is then reheated and *reduced* to correct size by a special operation *in compression*. This process was developed by and is used exclusively by Midwest.

Each Ell is made from one piece of plate by a patented Midwest process. The welded longitudinal seam along the inner circumference is made with a high tensile strength alloy rod and has a bead that makes it considerably heavier than the wall thickness; consequently, it acts as a reinforcing rib.

Final working of the metal is in compression at a forging heat—it is not extruded or stretched. Normalizing both plate and weld relieves stresses set up in forming or welding.

Made from the same material as Grade A seamless steel pipe, Midwest Ells have the same coefficient of expansion and welding characteristics. They are also made from Reading Puddled Iron. Stock sizes in both standard and extra heavy weight are 1" to 18". Made larger and from any standard alloy on special order.

MIDWEST VAN STONE WELDING NIPPLES

Loose flange has advantage over welded flange because bolt holes need not be carefully lined up before welding; result is a saving in time. Lap is *forged* by same patented process used for Midwest fabricated piping. Other features of lap: at least full pipe wall thickness, large radius, machined on back of lap and radius, phonographic finish for better gasket retention. Globack, Midwest and tongue and groove laps can be provided. End beveled for welding can also be shaped to fit header. Nipples made from wrought steel pipe and genuine wrought iron pipe; flanges are forged steel. Stock sizes 2" to 16".

MIDWEST WELDING HEADS

The ellipsoidal form reduces unit stress in the metal to a minimum. The long tangent puts the circumferential weld to the pipe entirely in tension—it is not subjected to shear and bending. Application is much easier and a neat appearing job is assured. Made from mild steel plate and genuine wrought iron in standard and extra heavy weight. Sizes 1½" to 24".

MIDWEST WELDING FITTINGS

ENGINEERS and contractors who are experienced with welded piping have been quick to recognize the advantages of the Midwest Welding Fittings shown here. It is not strange that many of these fittings were first offered to industry by Midwest—and that a number of them have highly desirable exclusive features. Midwest has been in the piping business for 27 years and has accumulated much experience in all its phases; Midwest was among the first to appreciate the possibilities of pipe welding and to use welding in its fabrications.

Midwest Fittings are probably the most complete line of welding fittings on the market today. There is a definite advantage in using one source of supply—in having the entire welded piping system of one high quality.

Space limitations make it impossible to here adequately describe each of the Midwest Welding Fittings. All the facts are given in Bulletin WF-10. Get a copy from the nearest Midwest office or distributor.

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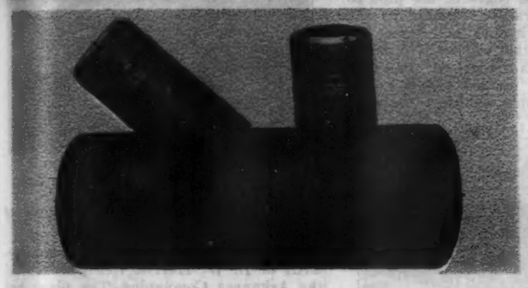

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It not only reinforces the junction of neck and body of a welded header but also compensates for the weakening of header body that results from loss of the metal cut out for the neck opening. Tests proved this saddle materially increases the strength of a welded header over customary gusset plate construction. Made from flanging quality steel; sizes from 2" x 2" to 24" x 24".

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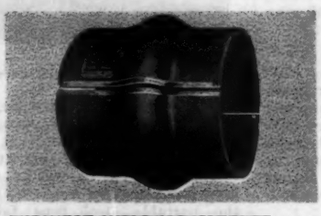

MIDWEST WELDING SLEEVES

Used to reinforce a butt line weld between two pieces of pipe, it relieves the butt weld of any bending stress and much of the tensile stress to which it would otherwise be subjected. Transverse recess in sleeve permits its application over the conventional butt line weld. Made from mild steel plate; sizes 4" to 24".

MIDWEST PIPING & SUPPLY COMPANY, INC.

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Confidence Shown by New Construction

Absorption Plant in Louisiana Dismantled and Rebuilt With Modern Equipment and Latest Methods

By W. Mike Murphy
Air Reduction Sales Co.

Opinion seems to be general at this time that the greatest present need of the oil industry is confidence in the future, expressed in action and not in the idle hope that an economic miracle would bring about a return to prosperity. The leaders in the business recognize the opportunities for future reward offered by the existing low prices of materials and abundance of experienced labor.

An example of active confidence in the natural gasoline business is shown by the Arkansas Fuel Oil Co., one of the Cities Service group, in dismantling its absorption plant in the depleted Carter-

Making sand screen for water well with the Airco mechanical beveling torch.

ville Field of Bossier Parish, Louisiana, and rebuilding it, with improved construction methods, near Willow Springs in the East Texas Field.

The location of the plant is on the Smith tract in the William H. Castleberry Survey, about 7 miles, by road, from Longview, Tex. Ground was broken for the plant and gathering system at the beginning of this year.

The plant site covers six acres, of which three acres are used for the buildings and equipment. All of the working parts of the plant, with the exception of storage tanks and steam boilers, are located within a space of approximately one acre, for ease and economy of operation.

Main Engine Room

The main engine room contains eight "Type 80" 85-horsepower Cooper-Bessemer compressors, with 17x20 compressor cylinders. The exhaust mufflers are built of 4'x6'x¼" steel eliptical headed tanks, the exhaust entering each through an 8-inch line at a tangent near the bottom and discharging through an 8-inch riser set in the center of the top.

The gas enters from the field at 10 inches vacuum, through a drip and scrubber located at each end of the main engine room. The scrubbers are connected and manifolded to the compressors with a 16-inch overhead intake header through the engine room.

The gas is discharged at 35 pounds pressure and flows through two gas coolers having 3,000,000 cubic feet capacity each, of the enclosed type manufactured by Southwestern Engineering Corp. It then passes through a 60"x38' Southwestern bubble tower absorption unit and out to the residue distribution system.

The heat exchangers, 60"x36' combination evaporator and reflux tower distillation unit, and oil cooler are of the Southwestern type. Oil circulation, both rich and lean, is with Worthington Duplex steam pump. Vapors from the distillation unit are liquefied in a Southwestern condenser.

The stabilizing unit is a product of Braun Manufacturing Co. A Fluor 600-gallon-per-minute capacity water cooling tower was installed in the cooling system.

The boiler installation consists of two 85-horsepower and two 75-horsepower oil field boilers, automatic gas fired and operating at 175 pounds. The feed water level is controlled by manual operation. The boilers as well as all other equipment of the plant containing a hot medium are insulated.

Water Procured From Well

An ample supply of cooling system and boiler feed water of good quality is secured, from a 568-foot well, using air lift. The sand screen for this well was made of three joints of 6-inch casing on the job. An Airco automatic bevelling torch was used to cut slots 6 inches long and 3 inches apart lengthwise in the pipe. The slots were staggered each 6 inches throughout the length of the joints. The purpose of this kind of a screen is to permit a part of the sand to be lifted with the water and thus reduce the necessity of agitating the well to keep a constant flow. The sand is removed from the water in a 4'x6' settling tank with sludge outlet near the well.

Equipment in the auxiliary engine room consists of a 50-horsepower type G-16 Cooper-Bessemer engine, a 10-K.W. constant duty Triumph electric D.C. generator, a Gardner-Denver 178 cubic

Arkansas Fuel Oil Co.'s natural gasoline plant near Willow Springs, Texas.

feet per minute capacity air compressor to be operated at 125 pounds pressure, and two Goulds centrifugal pumps for cooling system water circulation

The main engine room, auxiliary engine room, and oil house building are of the portable steel type fabricated by Stefco Steel Co.

The gasoline storage capacity at the plant is 36,000 gallons in five horizontal tanks. These tanks are mounted on unique saddles fabricated from tank steel and supported by trusses built with 4-inch junk pipe.

The gasoline is transferred to the loading rack at Willow Springs through 13,000 feet of welded 2-inch pipe, using a 6-4-6 Worthington Duplex steam pump. All of the production of the plant is to be shipped to the Louisiana Oil & Refining Co. at Shreveport, a distance of 70 miles, for use as blending stock. Because of the short haul there will be a steady movement of the production of the plant.

Operating at a capacity of 6,000,000 cubic feet per day, the maximum yield of the plant is expected to be approximately 25,000 gallons of 26-70 grade N.G.A.A. specification gasoline per day.

The gathering system consists of approximately 20 miles of 14 to 6-inch pipe in six main vacuum lines of the telescopic type radiating from the plant. Connected to the main lines is an approximately equal amount of pipe of smaller diameters in lateral lines to the leases. Six and 4-inch lines were laid parallel to and in the same ditch with the vacuum lines for return of the residue gas to the leases for production operations. The greater part of the pipe used had been salvaged from obsolete lines in other fields.

Vacuum Lines Welded

The vacuum lines were welded throughout, using the Aircowelding process recently introduced by the Air Reduction Sales Co. It is an economical method of oxyacetylene welding, producing a consistent quality of welds of greater strength than the pipe by the use of an alloy rod and a welding technique developed in the Air Reduction Sales Co.'s research laboratories. The speed of welding is greater than twice that of ripple welding and the weld requires approximately half the materials formerly used. The process is extremely simple, consisting of merely heating the bevelled edges of the pipe to a sweating temperature, similar to the heat used by a blacksmith, and fusing the welding rod into the vee with a backhanded uphill manipulation. Bell-hole welding with this method requires less skill than with ripple welding; the weld starting at the top and proceeding down each side, is finished at the bottom.

The edges of the salvaged pipe were prepared for welding with an Airco automatic bevelling torch, supplied to the job by the Air Reduction Sales Co. This machine, weighing about 50 pounds, was designed for use in cutting up old lines, leaving a bevelled edge ready for rewelding on completion of the cut. An operator and helper were able to make 200 cuts on 10-inch pipe in a 10-hour day. Gas consumption was less than that required for cutting by hand.

All exposed metal surfaces in the plant were painted, primarily for appearance. No paint or other protection was placed on the pipe in the gathering system. The welds were brushed with No-Ox-Id immediately after completion.

Economical

In the design of this plant and gathering system emphasis was placed on economy, both in the construction cost and in the expected operating cost. The plant was designed for compactness to reduce the amount of material required, lower the resistance to gas and liquid circulation and add to the flexibility of operation. No bends were used in the plant except where absolutely necessary, because of lowered operating efficiency. A minimum of concrete and other materials of no salvage value was used. Where steel was required in construction junk pipe was used wherever possible. Allowance was made for expansion of capacity in the original design.

In the design of the gathering system consideration was given to the capacity of the lines, cost of construction, quality of the type of joint used for the transportation of wet gas, and finally the ease and economy of salvage of the lines after depleting of the field has caused the plant to become obsolete. In the quality of the joint used in the vacuum lines, the certainty of freedom from leakage is of particular importance because of the loss of vacuum, hazard to plant operation by water and air intrusion, increased pumping expense, and loss of efficiency of absorption.

Bell hole welding 14-inch vacuum line.

This project was under the management of D. W. Harris, vice president of the Arkansas Companies. The plant and gathering system was designed and built under the general supervision of K. E. Jones, general superintendent of gasoline plants. The work was directed by E. P. Farmer, superintendent of construction.

DETROIT GAS EXECUTIVE EXPECTS LINE THIS YEAR

DETROIT, Mich., June 4.—William G. Woolfolk, president of the Detroit City Gas Co., in a hearing before the common council said that the company would be willing to buy natural gas both from the Texas fields and the Michigan fields if Michigan's supply proves adequate.

The hearing developed into a debate on the merits of Texas natural gas, which is being piped to Chicago and several other Mid-Western cities, and gas from the newly discovered fields in Central Michigan.

The Michigan Field is yet unproven, Mr. Woolfolk said, and it is not known whether the supply is large enough for Detroit or whether it will last. Detroit can buy Texas gas at a price approximately a third less than the cheapest manufactured gas it buys now, he said. The Texas supply is expected to last 25 years.

The gas company wants to introduce natural gas to reduce industrial rates and recapture industrial customers that are now using coke and oil fuels, he said.

Detroit now has a rate for household gas of 79 cents per 1,000 feet of 530 B.t.u. quality, and is the fourth largest gas company in the world, he said, with an annual sale of 21,000,000,000 feet.

Mr. Woolfolk denied that the American Light & Traction Co., which owns the Detroit City Gas Co., and also operates a pipe line from the Texas fields into the St. Paul district, is interested financially in the Panhandle Eastern Pipe Line, which the Detroit company proposes to tap in Indiana.

Formation of Gum in Gasoline and Effect On Engine Operation

Design of Motor a Large Factor as Well as Tendency of Fuel to Form Residues

By Oscar C. Bridgeman
U. S. Bureau of Standards*

The precise nature of the unstable constituents in gasolines is not known, and no direct method is available for measuring the amounts present in any gasoline. Since the presence of these constituents is made known through gum deposition in the engine, a process of evaporation suggests itself as an indirect laboratory way of measuring the amounts of unstable constituents present in the gasoline. In order to be satisfactory, such a laboratory method must give results which mean something in terms of gum deposition in the engine; and the closer the method comes to simulating manifold conditions, the better are the chances that the results will be significant. Evaporation in the manifold takes place in a stream of air of varying velocity over a considerable range of temperatures and during a very brief time interval. In the laboratory, therefore, choice of a method in which the gasoline is evaporated under

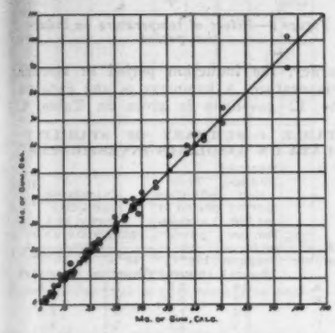

Figure 1—Air-jet volume series.

an air jet seems appropriate. To be significant, however, the effects of time of evaporation and of temperature should be evaluated.

In a previous paper[1], a large volume of experimental data was presented showing indirectly the effect of time of evaporation. Since it is difficult to control this factor directly, the procedure adopted was to evaporate various volumes (ranging from 10 to 90 ml.) of each gasoline on the steam bath by the air-jet method. Variations in the weight of residue, computed back to 100 ml. of gasoline, were then indicative of the effect of evaporatime on the measured gum content. It was found that the data on each gasoline could be represented within experimental error by an equation of the type:

$$W = b(100+V) \qquad (1)$$

where W is the weight of gum computed on a basis of 100 ml. V is the volume evaporated in ml., and b is a constant for each gasoline. The agreement between the observed weights of gum—obtained on the evaporation of various volumes of a number of gasolines—and the values computed from Equation 1 using the appropriate value of b for each gasoline is shown in Figure 1.

It is obvious from Equation 1 that the relative gum contents of any two gasolines, obtained by evaporating equal volumes, are independent of the particular volume evaporated, since 100+V is the same in the two cases. Accordingly, changes in time of evaporation brought about by changes in the volume evaporated compensate in such a way that the relative gum contents of the two gasolines are unchanged. This conclusion holds —regardless of differences in the time of evaporation between the two gasolines— for a given volume evaporated. Thus, it is possible to choose any convenient volume for the evaporation experiment.

The experiments on volume evaporated and, hence, on time of evaporation were conducted at one temperature, viz., on the steam bath. The next phase of the investigation involved a study of the effect of bath temperature, for which purpose two series of experiments were undertaken. In the first series, three volumes each of six different gasolines were evaporated under the air jet in an air oven maintained at the three temperatures: 70°, 105° and 135° C. Temperature was found to have only a slight effect on measured gum content. However, the relative gum content of the six gasolines were the same within experimental error, regardless of the temperature or of the volume which was evaporated. These data are given in Table 1. The last column shows the average relative gum contents, taking the gum content of Sample 6 as unity. Using these average ratios as a basis, the data in each series were smoothed, so that the deviations between "observed" and "smoothed" values were at a minimum. The "smoothed" values are given in Column 5, while the deviations between "observed" and "smoothed" values are listed in Column 6. The agreement between the "observed" values and those "smoothed" on the basis of the same relative gum contents is shown graphically in Figure 2.

The small influence of temperature on the magnitude of the measured gum contents was attributed to the fact that, owing to the low heat capacity of air and the high latent heat of evaporation of gasoline, the actual gasoline temperatures were about the same at the three oven temperatures. Accordingly, a second series of temperature experiments was undertaken in which the gasolines were heated by liquids boiling at various temperatures. For this purpose, there was used an apparatus[2] designed and constructed by the General Motors Research Laboratories and made available to the U. S. Bureau of Standards. Four different bath liquids were employed, viz., tetralin, amyl acetate, water and methyl alcohol; and the measured bath temperatures were 203°, 131°, 100° and 66°, respectively. Fifty milliliter portions of each gasoline were evaporated to dryness in a beaker and then allowed to remain in the apparatus for an additional 15 minutes with the air still flowing. The rate of air-flow used was 800 ml. per second. The beaker was removed to a desiccator containing calcium chloride; and, after cooling 30 minutes, was weighed in a balance, the inside of which was dried with calcium chloride. Each beaker was then placed in an air oven at 105° C. for 20 hours in order to reach constant weight. For comparison, air-jet values on the steam bath were also obtained.

Determinations were made in duplicate on six samples of gasoline at each of the four temperatures, and the results are given in Table 2. It is seen that the additional drying in the air oven for 20 hours does not change the weight of gum appreciably when tetralin is used as a bath liquid, but does produce considerable change after evaporation at the three lower temperatures. The actual gum contents of the gasolines decrease considerably with change in temperature, but the relative values are independent of bath temperature. This is shown in Table 3, in which the "smoothed" values were obtained in a manner similar to that outlined in connection with Table 1. The relative values by the air-jet method, using steam-bath evaporation, are the same as those at the four temperatures using liquid baths. The agreement between "observed" and "smoothed" values is shown in Figure 3 where the observed weights of gum are plotted against values calculated on the basis of the same relative gum contents. The grand average deviation from constancy of relative values is 1.3 mg.

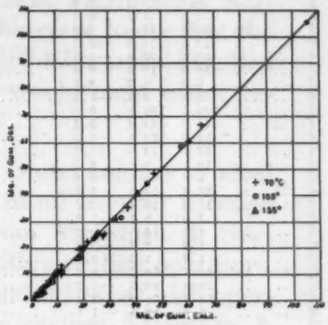

Figure 2—Air-oven temperature series.

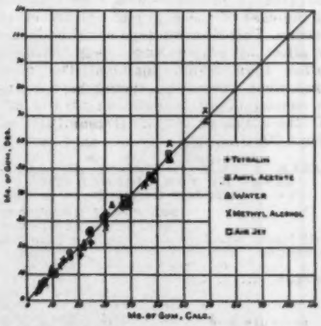

Figure 3—Liquid-bath temperature series.

Accordingly, it appears that the same relative gum contents of a series of gasolines may be obtained over a wide range of volumes evaporated, of times of evaporation, and of temperatures of evaporation. It was found previously[3] that over a wide range of air-flows, using the air-jet method, the measured gum content is independent of the rate of air-flow. Values obtained, therefore, by any convenient air-jet method should be equally significant as regards gum deposition in the

PROGRESS IN GUM TESTING IN GASOLINES

DEPOSITS of sticky or of resinous material, resulting from evaporation of the gasoline, may accumulate on the intake valves of an engine to such an extent that they will interfere with the proper functioning of the valves. This necessitates an overhaul of the engine, which is a source of considerable annoyance to the motorist if required frequently. These deposits on the intake valves or in the intake manifold, called "gum," are formed from unstable constituents in the gasoline during the evaporation process. The greater the concentration of these constituents in the gasoline, the more gum will be deposited under any given set of operating conditions. On the other hand, changes can be made in the amount of the gasoline evaporated in the manifold which will reduce the amount of gum deposited per unit quantity of gasoline consumed. The permissible gum content of a gasoline depends, therefore, upon the design of the manifold and upon the operating conditions. The petroleum refiner can assist in the solution of the gum problem by marketing a product which is practically free from gum and which will remain so at all times until the gasoline is used. The automotive engineer can assist in minimizing gum formation by studying the design of the induction system. Little work has been done to date at the U. S. Bureau of Standards on permissible gum contents, but preliminary work is in progress leading to a thorough investigation of this phase of the general problem.

Two other phases of the problem are of interest, viz., the establishment of a method of test for gum content and the development of a method of test for gum stability in storage. Both of these phases have been investigated intensively, and progress has been made. It has been found that the relative gum contents of gasolines are numerically the same when evaporated under an air jet—regardless of the volume evaporated or the temperature of evaporation—so long as these variables are comparable in any one series of determinations. Hence, any convenient and reproducible air-jet method may be used, and should give relative results significant as regards deposition of gum in the engine. In connection with gum-stability methods, the results to date have thrown considerable doubt on the adequacy of the usual accelerated oxidation test, even when made at several temperatures to permit an accurate extrapolation to storage temperatures. It is increasingly apparent that a satisfactory method for testing gum stability must be based on measurement of the gum content after a period of accelerated gum formation.

The general conclusions outlined are based on the work which the U. S. Bureau of Standards has been doing on the gum problem in co-operation with the U. S. Air Corps and recently under the auspices of the Co-operative Fuel Research Steering Committee.

*Publication approved by Director, Bureau of Standards (U. S. Department of Commerce.) Midyear meeting, American Petroleum Institute, Tulsa, June 3.

engine. Hence, a set of comparisons between amounts of gum deposited in the engine and results obtained by any chosen air-jet method should be sufficient.

TABLE 1—GUM CONTENT VALUES IN AIR OVEN-JET SERIES

Gasoline No.	Temperature (°C.)	Volume (milliliters)	Observed (milligrams of gum)	Smoothed (milligrams of gum)	Observed minus Δ smoothed	Ratio
6	70	25	25 2	27 0	—1 7	1 00
5	...	...	11.9	11.3	0 6	0.42
4	...	...	10.2	8 9	1 3	0 33
3	...	...	5 5	4 9	0 6	0 18
2	...	...	3.0	2 5	0.5	0.091
1	...	...	1 7	1 7	0 0	0.062
6	...	50	66.8	65.0	1.8	.....
5	...	...	24 6	27.3	—2.7	.....
4	...	...	22.5	21.5	1 0	.....
3	...	...	13 5	11.7	1.8	.....
2	...	...	5 5	5 9	—0 4	.....
1	...	...	3.0	4.1	—1 1	.....
6	...	75	111.1	112 0	—0.9	.....
5	...	...	48.4	47.1	1 3	.....
4	...	...	25 2	27 0	—1 7	.....
3	...	...	20 4	20 2	0.2	.....
2	...	...	11 2	10 2	1.1	.....
1	...	...	6.9	6 9	0 0	.....
6	105	25	24.3	25 0	—0 7	....
5	...	...	10 9	10.5	0.4	.....
4	...	...	5 1	5.2	—0 1	.....
3	...	...	4 6	4.5	0.1	.....
2	...	...	2.7	2.3	0.4	.....
1	...	...	2 0	1 6	0.4	.....
6	...	50	58 4	57.5	0.9	.....
5	...	...	24 1	24.2	—0.1	.....
4	...	...	17 5	19.0	—1 5	.....
3	...	...	10 2	10 2	0.0	.....
2	...	...	5.3	5.2	0.1	.....
1	...	...	2 4	3 6	—1.2	.....
6	...	75	105.5	105.5	0.0	.....
5	...	...	44 6	44 4	0.2	.....
4	...	...	21 5	24 8	—3.3	.....
3	...	...	17 7	19 0	—1.3	.....
2	...	...	10.1	9.6	0 5	.....
1	...	...	6 9	6.5	0 4	.....
6	135	25	24 8	24.8	0.0	.....
5	...	...	11.6	10 4	1 2	.....
4	...	...	7 0	8.2	—1 2	.....
3	...	...	4 2	4 5	—0.2	.....
2	...	...	2 0	2 3	—0 3	.....
1	...	...	1 6	1 6	0.0	.....
6	105	50	60.7	60.7	0.0	.....
5	...	...	25 3	25.5	—0.2	.....
4	...	...	18 6	20.0	—1 4	.....
3	...	...	9 8	10 9	—1.1	.....
2	...	...	5 4	5.6	—0.2	.....
1	...	...	4.0	3 8	0.2	.....
6	135	75	.....	.....	.....	.....
5	...	...	46 7	46 7	0 0	.....
4	...	...	31.3	32.0	—0 7	.....
3	...	...	16.0	17 5	—1 5	.....
2	...	...	6.6	6 8	—0 2	.....
1	...	...	6 5	6.0	0 5	.....

Av. Δ—0.7 mg.

The choice of the most convenient air-jet method appears to involve a compromise. If evaporation on the steam bath is employed, subsequent drying over night is necessary to reach constant weight. On the other hand, if a liquid bath at about 200° C. is employed, subsequent drying for 15 minutes is all that is required to reach constant weight. However, the measured gum contents by the latter method are only about one-half of those by the former method; and, from present indications regarding permissible gum contents for satisfactory engine operation, too great a precision would be required in the case of the high-temperature evaporation. This disadvantage could be largely offset by evaporating 100-ml. samples rather than 50-ml. portions. The most convenient procedure, therefore, appears to consist of an evaporation of 100 ml. of the gasoline at a temperature of about 200°C.

TABLE 2—GUM CONTENTS OF GASOLINES BY THE LIQUID-BATH AIR-JET METHOD

Bath liquid employed	Gasoline number	Milligrams of gum per 50 ml. (15 min. drying)		Milligrams of gum per 50 ml. (30 hrs. drying)	
Tetralin	7	3.3	3.5	3.0	3.1
	8	5.8	4.9	5.8	4.9
	9	14.3	15.7	14.6	15.8
	10	17.1	16.7	17.9	17.1
	11	22.0	21.1	22.2	21.5
	12	31.4	33.0	31.3	33.0
Amyl acetate .	7	5.8	6.1	3.7	4.1
	8	9.1	9.0	7.4	6.6
	9	17.7	19.7	16.7	18.2
	10	31.0	29.4	26.9	25.3
	11	33.0	32.9	30.3	31.8
	12	38.3	38.3	35.5	36.9
Water	7	11.9	12.0	6.3	5.9
	8	27.6	27.1	11.8	10.4
	9	28.7	32.1	20.3	21.4
	10	42.6	42.9	35.8	36.4
	11	55.2	54.3	36.0	36.8
	12	83.6	80.0	46.9	45.9
Methyl alcohol.	7	19.8	18.9	7.8	8.4
	8	41.5	40.6	13.3	13.3
	9	58.4	57.9	29.4	27.9
	10	97.8	99.1	44.7	43.4
	11	108.1	113.7	53.9	59.9
	12	161.2	161.4	68.6	72.6

Gum Stability

Gasolines are frequently stored over periods ranging from six months to two years; and, if the gasoline is to be satisfactory as a motor fuel at the end of that period, its gum content must not have become greater than the permissible value for satisfactory engine performance. Obviously, it is important to be able to predict in advance how much gum will be present at the end of the storage period.

The problem of predicting how long a gasoline may be stored without excessive gum formation is difficult; for not only is the gum stability a function of the particular gasoline under consideration, but it is also dependent upon the conditions of storage. Furthermore, in order to verify the significance of any test method, a comparison should be made with the results of storage tests. Experiments made by various investigators have indicated that gum formation may be closely related to oxidation processes occurring in the gasoline; and, hence, suggest that the susceptibility to oxidation may parallel the rapidity of gum formation.

Since the oxidation of gasoline by gaseous oxygen is very slow at ordinary atmospheric temperatures and pressures, it is necessary to find some means of accelerating the action in order to obtain a practical test method. Three means are available.

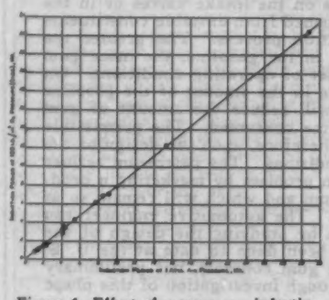

Figure 4—Effect of pressure on induction period.

1. Increasing the oxygen pressure.
2. Increasing the temperature during the oxidation process.
3. Introducing a catalyst.

An increase in the oxygen pressure alone will not, in general, accelerate the reaction sufficiently to permit a test to be conducted in a reasonable period of time; so that, in addition, it is desirable to increase the temperature or to introduce a catalyst. Whereas changes in oxygen pressure alone will not ordinarily change the character of the total oxidation process, increase in temperature or the presence of catalytic agents may exert more effect on certain reactions than on others, thereby making the character of the total oxidation process different from that which occurs during storage. Therefore, it would be necessary to evaluate the effect of either temperature or catalyst and make a correction to a non-catalyzed reaction at ordinary storage temperatures.

In evaluating the effect of temperature, it is possible to follow the usual method of making measurements at various elevated temperatures and extrapolating to the desired lower temperature. The evaluation of the effect of catalytic agents is, however, not so simple; for, ordinarily, only an extremely small amount of catalyst is necessary and, in general, it is not possible to make measurements with various amounts of a catalytic agent and extrapolate to a noncatalyzed state. Accordingly, temperature was chosen as the means of accelerating the oxidation reaction. The apparatus and procedure employed in the present work have been previously described[3], and reference should be made to this paper for a detailed description.

The effect of oxygen pressure was determined by making accelerated oxidation experiments using various oxygen pressures in the bombs, and noting the induction periods. As referred to in this paper, the "observed induction period" is the interval between the time of introduction of the bomb into the oxidation bath and the time at which the pressure commenced to drop. The "oxygen pressure" is the filling pressure at 0° C., which was the temperature used for filling the bombs. It was found in all cases that a plot of induction period against oxygen pressure gave a straight line. A comparison of all of the data obtained indicated that the ratio of the induction period at 100 pounds per square inch oxygen gauge pressure to the induction period corresponding to 1 atmosphere absolute air pressure (3 pounds per square inch absolute oxygen pressure) was independent of both the temperature and the particular gasoline employed. This is illustrated in Figure 4 where all of the induction period data at 100 pounds per square inch oxygen pressure are plotted against the values at 1 atmosphere air pressure. The equation of the line through the points is:

$$I_{1\ \text{atmosphere}} = 1.25\ I_{100} \qquad (2)$$

where I is used as a symbol for induction period expressed in hours. Since the induction period of interest as regards storage is that corresponding to 1 atmosphere air pressure, all of the observed induction periods throughout this paper were computed to 1 atmosphere air values by means of equation (2).

Preliminary to a study of the effect of temperature on induction period, measurements were made of the time required after introduction into the bath for the gasoline in the bombs to heat from the filling temperature (0° C.) to the temperature of the experiment. Since the change in induction period with temperature is large, it is evident that the observed induction period is longer than the true isothermal induction period at the bath temperature. Time-temperature curves were obtained on a number of gasolines during the time of heating to various bath temperatures, and it was found[4] that the observed induction period was longer than the true isothermal induction period by 0.8 hour, regardless of bath temperature over the range from 120° C. to 60° C. Accordingly, 0.8 hour was subtracted from all observed induction periods.

Average Δ = 1.3 mg.

TABLE 3—GUM CONTENT VALUES IN LIQUID BATH-TEMPERATURE SERIES

Bath liquid	Gasoline number	Observed gum contents, milligrams of gum per 50 ml.		Smoothed gum contents milligrams of gum per 50 ml.	Observed minus Δ smoothed		Ratio
Tetraline	7	3.0	3.1	3.4	—0.4	—0.3	0.11
	8	5.8	4.9	5.8	0.0	0.9	0.19
	9	14.6	15 8	13.8	0.8	2.0	0.45
	10	17.9	17.1	20.5	—2.6	—3.4	0.67
	11	22.2	21.5	24.5	—2.3	—3.0	0.80
	12	31.3	33.0	30.6	1.3	2 4	1.00
Amyl acetate	7	3.7	4.1	4.1	—0.4	0.0	....
	8	7.4	6.6	7.0	0.4	—0.4	....
	9	16.7	18.2	16 6	0.1	1.4	....
	10	26.9	25.3	24.7	2.2	0.6	....
	11	30.2	31.8	29.5	0.7	2.3	....
	12	35.5	36.9	36.9	—1.4	0.0	....
Water	7	6.3	5.9	5.4	0.9	0.5	....
	8	11.8	10.4	9.3	2.5	1.1	....
	9	20.2	21.4	22.0	—1.8	—0.6	....
	10	35.8	36.4	32.8	3.0	3.6	....
	11	36.0	36.8	39 1	—3.1	—2.3	....
	12	48.9	45.9	48.9	0.0	—3.0	....
Methyl alcohol	7	7.8	6.4	7.5	0.3	—1.1	....
	8	13.3	12.3	13 0	0.3	0.3	....
	9	29.4	27.9	30.9	—1.5	—3.0	....
	10	44.7	43.4	46.0	—1.3	—2.6	....
	11	53.9	59.9	55.0	—1.1	4.9	....
	12	68 6	72.6	68.6	0.0	4 0	....
Air-jet	7	6.5	6.9	6.7	—0.2	0.2	....
	8	9.9	11.3	10.6	—0.7	0.6	....
	9	22.7	26.4	24 0	—1.3	1.4	....
	10	36.8	38.4	37.6	—0.8	0.8	....
	11	46.5	47.7	47.1	—0.5	0.6	....
	12	53.6	55.7	54.6	—1.0	1.1	....

Data were obtained on 12 gasolines at 10° C. intervals over a temperature range of 30° C. or 40° C. in each case, and it was found that the data on each gasoline could be reproduced by an equation of the form:

$$\log I_t = A + \frac{B}{T} \qquad (3)$$

where I_t is the true induction period in hours at 1 atmosphere air pressure, T is the bath temperature in absolute degrees, and A and B are constants characteristic of each gasoline. By means of this equation, it is possible to obtain from the experimental data on each gasoline a value representing, with moderate accuracy, the induction period at storage temperature. A summary of the data on the 12 gasolines is given in Table 4,

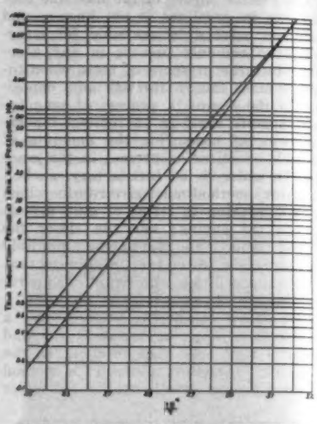

Figure 5—Effect of temperature on induction period.

TABLE 4—SUMMARY OF STABILITY DATA ON GASOLINES INVESTIGATED

Fuel number	Observed induction period at 100 lbs. per sq. in. of oxygen (hours)	True induction period at 1 atmosphere air (hours)	Calculated induction period at 1 atmosphere air 40° C. (months)	30° C. (months)
A	2.9	3.8	2.5	7.3
B	1.2	0.7	0.1	0.3
C	1.6	1.2	0.1	0.3
D	3.1	3.1	2.6	9.9
E	2.9	2.8	2.0	7.2
F	1.9	1.6	1.9	7.9
G	3.1	3.1	1.4	4.7
H	2.2	2.0	1.4	5.3
I	1.2	0.7	0.1	0.3
J	1.6	1.2	1.0	3.5
K	3.5	3.6	3.4	12.8
L	2.2	2.6	3.6	16.1

where the first column represents the observed induction periods in hours at 100° C. and 100 pounds per square inch oxygen pressure; the second column represents the true induction periods in hours at 100° C. and 1 atmosphere air pressure; while the last two columns represent the predicted stability of these gasolines in months at the storage temperatures of 40° C. and 30° C. computed from equation (3).

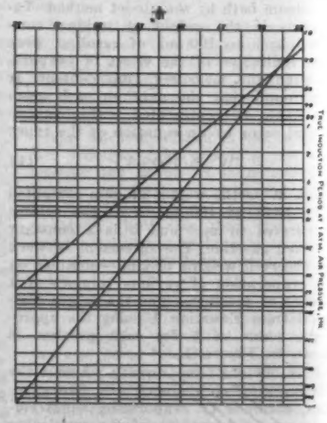

Figure 6—Effect of temperature on induction period.

One important point brought to light

in this study of the effect of temperature was the fact that two gasolines might have the same induction period at 100° C. and yet have quite different induction periods at storage temperatures. Similarly, two gasolines might be equally stable in storage and yet have considerably different induction periods at 100° C. These conclusions are corroborated by the data in Table 4, and are illustrated graphically in Figures 5 and 6. Accordingly, it appears necessary to measure the induction periods at a sufficient number of temperatures to make possible an extrapolation to storage temperature if even an approximate estimate of the induction period in storage is to be obtained.

Measurement of the induction period at two or more temperatures should indicate a solution to the problem of gum stability in storage, if the induction period is a true measure of the gum-forming characteristics of the gasoline. In order to investigate this point, a series of measurements have been made of the gum contents of a number of gasolines at various times before and after the induction period, when heated under oxygen pressure at various elevated temperatures from 60° C. to 120° C. Typical results are shown in Figure 7. In every case it

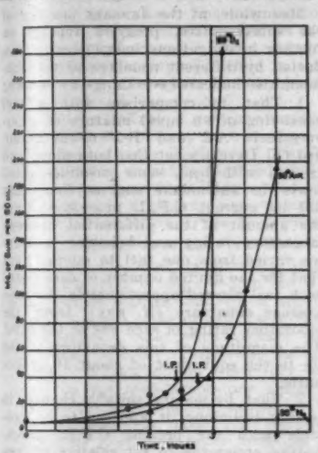

Figure 7—Increase in gum content on heating at 100° C.

was found that gum formed before the end of the induction period. This was also observed when air was used instead of oxygen. Since the amounts of gum formed in most cases were considerably in excess of any reasonable value for permissible gum content, it seems very doubtful whether measurement of induction periods gives any real indication of gum stability in storage. A more rational procedure would be to measure the gum contents at various periods of time when the gasolines are heated at a number of elevated temperatures and by extrapolation to obtain information on the predicted times at storage temperatures at which the gum content would reach various values. Work along this line is in active progress.

Gum Deposition

The aggregate amount of gum which can be deposited in the intake manifold and on the intake valves, over a reasonable period of time without interfering with engine performance, is the criterion which determines the permissible gum content of gasolines. Since the gasoline may be only partially evaporated in the induction system, and since some of the gum formed by evaporation of fine droplets in the air stream may be carried into the cylinder, the total amount of gum deposited should be less than the total gum content of the gasoline consumed. Under any given set of operating conditions, the relative amounts of gum deposited by two gasolines of similar volatility should be equal to the relative gum contents of the two gasolines. If the volatiles of the two gasolines are quite different, deviations from this conclusion would be anticipated.

The total amount of gum deposited from any given gasoline may depend upon the degree of vaporization in the manifold, the percentage of liquid carried into the cylinders unvaporized, the temperature of the manifold walls and of the intake valves and seats, the temperature of the charge, and the design of the manifold system—some of which are interrelated. Accordingly, in order to determine the permissible gum content of gasolines, it is necessary to investigate the effect of the variables mentioned. Little work has been done on this phase of the investigation as yet, but plans have been formulated for a comprehensive study along these lines. Since it would be a gigantic task to investigate all of these variables in a number of cars on the road and with a number of gasolines, it is planned to construct model induction systems and carry on the major portion of the investigation in the laboratory. Final check with gum deposition in cars on the road will, of course, be necessary; but the laboratory work should yield much information of value, not only on permissible gum contents but also on possible modifications in manifold design tending towards minimizing gum deposition.

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[2]Proc. Am. Soc. Testing Materials, 1932 (in press).
[3]J. Soc. Automotive Eng., Feb. 1931, p. 194.
[4]J. Soc. Automotive Eng., May 1932, p. 198.

TEN TESTS IN NEBRASKA COVER STATEWIDE AREA

Ten drilling operations in Nebraska, scattered over 10 counties in the southwestern, northern, eastern, southern and central parts of the State, are all shut down at depths varying from spudding depth to 5,678 feet, according to the last roundup of information.

In the southeastern part of the State, Wonder & Burkhardt's No. 1 Livingston, NW SE NW, Section 35-1n-1e, is shut down at 1,114 feet. This test is near Fairbury, county seat of Jefferson County, and just north of the Kansas state line. Also in the southeast, in Richardson County, and not far from Falls City, is Norton and others' No. 1 Hanson, NE NE, Section 26-1n-14e, shut down at 3,150 feet.

In Cass County, in the extreme east and 15 miles or less south of Plattsmouth, is Williams and others' test in the SW SW, Section 20-10-13e, shut down at 440 feet.

In Webster County, close to Red Cloud, is Mid-State Exploration Co.'s No. 1 Platt, C SE, Section 3-1n-11w, shut down at 3,495 feet.

North of Beaver City, in Furnas County, one of the southern tier counties, is Southwest Petroleum Corp.'s No. 1 Montague, SE SW SW, Section 28-1n-22w, shut down at 1,785 feet.

Near Campbell, a station on the C.B. & Q. Railroad, in Franklin County, is the United States Drilling Co.'s test, in the NE NE, Section 35-4n-13w, spudded in and shut down.

In Phelps County, the Trees Brothers' No. 1 Bergman, C SW, Section 23-6n-19w, west of the county seat, Holdrege is shut down at 5,678 feet.

Far to the southwest, in Chase County, near Imperial, the county seat, the Chase Petroleum Co. is shut down at 3,472 feet in its No. 1 Ingalls, C NE, Section 24-6n-38w.

In Rock County, about 15 or 20 miles south of the South Dakota state line and northeast of Bassett, the county seat, Osborn and others are shut down at 1,800 feet on their test in the SE NE, Section 14-32n-18w.

In the far northwest, Sturges' test on the Innis land, NW SW, Section 19-32n-50w, south of Chadron, the county seat, is shut down at 500 feet.

In addition to the above tests, Haney and others' are rigged up and shut down on No. 1 Newton, NE NE, Section 23-2n-21w, Furnas County.

P. B. MACOUGHTRY DIES

HOUSTON, Tex., June 6.—Paul B. Macoughtry, member of the legal department of the Humble Oil & Refining Co., died May 31 at Houston. He was 50 years old.

McINTOSH & SEYMOUR DIESEL ENGINES

At Kilgore, Texas—

THE modern main-line pumping station of Magnolia Petroleum Company here is one of the largest in the country, is highly efficient and economical and is characterized by good engineering throughout.

This owner bought its first three McIntosh & Seymour Engines in 1926, and therefore knew that the 450-b.hp. unit and the three 180-b.hp. units installed at Kilgore as shown below, would meet every requirement well.

Today's preference for good Diesel engines as ideal power in the exacting work of oil transfer through pipe lines comes largely from McIntosh & Seymour's early co-operation with pipe line operators, and from the dependability and *sustained* high operating economies of even the earliest McIntosh & Seymour pipe line installations. Some of these have enviable records dating back to 1916.

Present McIntosh & Seymour Units for direct, geared or generator drive offer a wide power selection for reciprocating or centrifugal pumps in main propulsion or gathering service for lines of any size. Let us submit performance data on both long-proven and more recent installations.

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Correlation of Knock Ratings in Fuel and Service Performance

Committee Reports Progress In Perfecting Road Test Procedure

By T. A. Boyd
General Motors Corp.*

One of the most important points about any laboratory testing method, as well as one of the principal problems of most of them, is the matter of getting the results of test to conform to those obtained in service. It was for this reason that, immediately following the development of a common apparatus and method for making laboratory knock ratings and the adoption of a uniform scale for expressing antiknock quality, the detonation subcommittee was instructed by the Cooperative Fuel Research Committee to undertake a comprehensive study of the matter of relating knock ratings, as made by the C.F.R. apparatus and method, to the actual road performance of fuels in automobile engines.

A considerable amount of past experience on the part of various men, obtained incidentally in connection with the development of knock-testing methods, had indicated that at the time of their tests the agreement between behavior in service laboratory ratings as made by the apparatus and method in use was reasonably good, at least for conventional gasolines as available up to that time. The tests, upon which the observation as just made were based, were conducted for the most part by members of the subcommittee. They were not, however, conducted in a co-operative or an official manner by the subcommittee as a whole, and in no case was use made of the complete C.F.R. knock-testing unit as finally agreed upon in a tentative way. Naturally, it was first necessary to have a uniform apparatus and procedure by which the laboratory test results of the various co-operating members could be obtained on a comparable basis before laboratory results could be compared with behavior in service in a co-operative or a comprehensive manner.

Available Data Accumulated

One of the first things done by the subcommittee when it began the investigation of this problem last fall was to request laboratories which happened to have made comparisons of laboratory knock ratings with behavior in service—whether represented on the subcommittee or not—to report to the subcommittee such results as they might have. As a consequence of this request, a considerable amount of valuable data was received. These results, came mainly from six laboratories. The conclusions reached independently by each of the six, as compiled by D. B. Brooks of the U. S. Bureau of Standards, who analyzed the reports, are given as follows. First, however, it should be said that in these tests each laboratory followed its own plan or procedure, and that the objective of the tests was not always the same. Hence, the results are not strictly comparable in every instance:

Laboratory M—The fuels used by this laboratory all contained tetraethyl lead; hence the conclusions reached apply only to this type of fuel. The conclusions are that the majority of cars rate fuels differently than do laboratory test engines; that the latter do not agree with one another; that an increase in jacket temperature or use of a richer mixture ratio improves the correlation of laboratory and road tests.

Laboratory N—The deductions drawn were that laboratory and road tests of cracked leaded fuels disagree, and that varying the mixture ratio used in the road tests did not eliminate the discrepancy—the presumption being that change of some factor other than mixture ratio would improve the correlation quite materially.

Laboratory O—As a result of comparing laboratory ratings on three types of detonation test engines with road results, it was concluded that no marked superiority was shown by any of the three, the agreement between the laboratory engines being much closer than that of the road test cars. A conclusion drawn from another series of tests was that there is not constant difference between road and laboratory ratings of cracked as compared with leaded fuels.

Laboratory P—No deductions.

Laboratory Q—The conclusion drawn is that octane numbers correlate very closely with road tests, and that "maximum knock as reported in the laboratory is a good average of all conditions and as close to any evaluation by ear on the road."

Laboratory R—The purpose of this laboratory's tests was to determine whether high antiknock nonleaded fuels showed lower effective knock rating in service than leaded fuels of similar knock rating in the laboratory. The conclusion reached was that there was no substantial difference in the road performance of the two types of fuel.

Conclusions

In brief, three of the laboratories find no substantial difference—larger than the experimental error—between laboratory and road tests; while the other three find differences too large to be accounted for solely by error. Leaded-cracked, straightrun and California fuels are found in each category.

Now the conclusions from these tests, so concisely put by Mr. Brooks, appear to show, first, that in cars some fuels rate the same in antiknock quality—within the limits of ability to determine it—as they rate by conventional laboratory technique; and, second, that in other cases, or under other conditions, there are discrepancies between laboratory knock ratings and behavior in service. All of the work reported was carefully done; and, in spite of the fact that all results did not agree, it appears likely that the data are not in conflict. The results reported by some of the investigators suggest that, of the differences between the tests of the various investigators, one of the most outstanding is the composition of the fuels used in making the comparisons. That is to say, some of the investigators reported that in the cases of some fuels there are discrepancies between the ratings made in laboratory knock-testing engines and those made in automobile engines; while other fuels do not show such discrepancies. Consequently, unless both used the same fuels (which the laboratories participating in the above-mentioned tests did not), it would easily be possible for one investigator to find a discrepancy between the laboratory and the road, and for another to find none. And this was the case in the instance of the reports to which reference has just been made.

TABLE 1—Tabulation of Results Secured in First Series of Car Tests by the Special Subcommittee on Road Test Procedure

(The data given are in percentages of reference fuel "C-5" [approximate octane number 77] required to be added to reference fuel "A-2" [octane number 48] to match the fuel under test.)

		Fuel					
Test Unit—	Laboratory	RT-1	RT-2	RT-3	RT-4	RT-7	RT-8
C.F.R.	A,B,C,D,E	86	72	100	102	83	84
Buick, 6-30	B	70	66	80	...	...	...
	B	67	44	92	72	67	92
	D	28	...	53	42	...	...
	D	47	...	...	44	...	...
	D	44	...	58	60	...	...
	D	47	...	...	60	...	...
Buick, 8-32	A	50	62	67	63	71	88
	B	54	63	77	...	...	...
	B	70	72	82	82	48	73
	C	67	73	79	79	...	...
	C	55	73	76	76	60	85
	C	20	74	60	83	61	91
	D	47	...	53	57	...	...
	D	39	...	56	...	...	...
	D	66	...	...	...	...	...
	D	53	...	...	60	...	...
	D	45	...	54	...	...	...
	D	43	...	...	70	...	...
	D	43	...	...	...	...	...
	D	51	...	...	43	...	...
Chevrolet, 6-31	D	44	...	55	55	...	...
	D	50	...	...	55	...	...
	D	50	...	70	55	...	...
Chevrolet, 6-32	A	66	67	75	80	86	91
	C	66	74	84	90	...	...
	C	61	74	86	84	77	100
	C	55	86	85	87	63	100
	E	74	73	103	93	82	80
Chrysler, 6-30	A	71	70	90	91	53	77
Chrysler, 8-31	D	72	...	81	...	...	...
	D	63	...	83	93	...	...
	D	77	...	83	...	...	...
	D	88	...	...	92	...	...
	D	91	...	94	100	...	...
	D	85	...	...	...	...	...
Chrysler, 8-32	A	71	81	83	93	50	96
	A	...	...	...	...	61	88
	B	80	76	86	...	...	...
Auburn, 8-31	B	56	65	...	84	...	...
Ford, 4-31	D	29	...	43	72	...	...
	D	46	...	53	70	...	...
	D	64	...	66	...	...	...
LaSalle, 8-30	C	75	66	77	81	40	100
Packard, 8-29	C	20	70	63	57	55	81
Packard, 8-32	B	75	74	79	...	...	...
Studebaker, 8-30	E	70	72	85	85	58	65

Plans for Investigating Problem

At the time of the receipt of the reports in December of last year, as mentioned above, a special group from the subcommittee was appointed to prepare a program of investigation of this factor to be carried out under the direct auspices of the subcommittee. Such a program was settled upon at the meeting of the subcommittee held at the end of January of this year. In brief, this program consisted of two parts, as follows:

1. A series of co-operative road tests in cars on the part of several members of the subcommittee, to compare the car ratings of a number of selected fuels with conventional C.F.R. ratings. This group, hereafter called the "road test subcommittee," was asked, when selecting fuels for their tests, to choose some that are of the type on which discrepancies between C.F.R. ratings and behavior in service have been reported by different investigators and some of the type on which no disparity in cars has been reported.

2. Investigations to be made in the laboratory by individual members of the subcommittee, to evaluate the effects on the ratings of various types of gasolines of the changing of different conditions with respect to the C.F.R. knocktesting apparatus and method of test.

Meanwhile, at the January meeting of the subcommittee, progress reports on further investigations independently conducted by different members of the subcommittee indicated two things, as follows:

1. That, by comparison with a fuel consisting of an equal mixture of reference fuels "A-2" and "B-2" of the Standard Oil Development Co., both alone and treated with lead, some gasolines rated lower in automobile engines than they did by current C.F.R. procedure; that the amount of the differential between laboratory rating and behavior in service varied from one fuel to another but that for the limited number of cars tested each fuel showed approximately the same average departure (if any) from the laboratory rating in each one of the cars[1]. The magnitude of this departure varied up to the equivalent of about 10 octane units.

2. That, by making suitable changes in testing technique, it appears to be possible with the present C.F.R. knock-testing apparatus to get relative ratings on any given set of fuels which agree with the average behaviors of the given fuels in any given automobile engine.

First Report of Road Test Subcommittee

The special road test subcommittee mentioned above presented its first progress report at a meeting of the subcommittee held April 6. They reported the results of an extensive series of comparative tests on six gasolines. The six fuels selected by the members of the subcommittee and used in their tests ranged in octane number from 68 to about 77. They may be described as follows:

a. A straightrun California gasoline, reference fuel "B-2" of the Standard Oil Development Co.

b. A blend of 3 c.c. of lead tetraethyl per gallon in reference fuel "A-2" of the Standard Oil Development Co.

c. A vapor-phase cracked naphtha.

d. A liquid-phase cracked naphtha.

e. A vapor-phase cracked naphtha.

f. A 40 per cent blend of 1 deg. benzol in reference fuel "A-2."

For the purposes of the tests, these fuels were given symbols, such as "RT-1," "RT-2," etc., so that the compositions of the fuels might not be known to the operators of the cars. It should be said that the symbol numbers do not apply in numerical sequence to the fuels in the above list.

The method of test used consisted of matching each of the fuels in the various automobiles with blends of reference fuels "A-2" and "C-5" of the Standard Oil Development Co. (The octane number of reference fuel "A-2" is 48, and that of reference fuel "C-5" is approximately 77.) The matching was carried out so that the fuel under test fell between a reference fuel mixture of higher knock value and a mixture of lower

*Before A.P.I. Division of Refining, Tulsa, June, 1932.

[1]Upon extending the number of cars tested, these investigators later found that for any given gasoline the amount of the average differential between the laboratory rating and tendency to knock in service was not the same for every car.

knock value than the unknown fuel, but the bracket between these two mixtures was not greater than the equivalent of 5 octane units. All results were reported in terms of the percentage of reference fuel "C-5" in the mixture of reference fuels "A-2" and "C-5" required to match the fuel under test. Speed was used as the criterion rather than intensity of knock; since the former was found to give definite data, and the latter decidedly indeterminate results. For instance, having determined the speed at which knock stopped using the unknown fuel, the percentage of reference fuel "C-5" corresponding to the unknown fuel was calculated by interpolation from the speeds found when knocking stopped with blends of the reference fuels as indicated above. To aid in interpreting the results of the tests, it may be said that a 4 per cent in the proportion of reference fuel "C-5" represents a change equivalent to about 1 octane unit according to the C.F.R. procedure.

The data secured in the tests by the several members of the group are tabulated in Table 1, each value given there being an average of several check runs. Some of these tests were made on steep hills, some on level roads, and some on chassis dynamometers. The tests included a variation of procedure, so that in some instances the car speed was accelerated until the knock stopped; while in other cases the engine speed was decelerated until the knock commenced.

The data of Table 1 are shown graphically, and, accordingly, in a much more easily read manner in Figure 1. One important thing should be kept in mind in interpreting these data. This is that they represent only a progress report, and do not in any sense constitute final results.

Interpretation of Car Test Data

One of the most outstanding things about the data of Figure 1 is the wide variation in ratings obtained on any one fuel in a given make of car. These variations existed both when ratings were made by different laboratories using a different technique, and when they were made by the same laboratory using the same technique, but on repeating the tests on different dasy. The variations sometimes amounted to as much as the knock equivalent of 8 to 10 octane units.

The fuels themselves as rated by the conventional C.F.R. procedure varied in octane number from 68 for "RT-1" to about 77 for "RT-4," a total range of 9 octane numbers. So it was that the range of ratings of any one fuel obtained in any one car sometimes varied by as much as the total range for all the fuels tested.

On account of this relatively wide range in the ratings which they found on the road in different cars, and even in the same car from time to time, the special subcommittee on road test procedure felt that, in the light of their present knowledge, it is not as yet possible for a one-cylinder engine test procedure to be settled upon which will give results that correlate with service behavior for all cars. Consequently, the subcommittee pointed out the great need for developing a uniform technique for making road tests—one that will give results which are at once reasonably representative and uniform. Once it has been established what a representative average road rating is, then it appears that the C.F.R. procedure can be modified to give that rating. And so, at its own suggestion, the subcommittee was authorized to devote further attention to this important matter of road test procedure.

Analysis on Basis of Averages

From the data in Table 1 and Figure 1, D. B. Brooks has tabulated the average rating obtained for each one of the fuels on all cars, as follows:

Fuel	C. F. R. rating in min. aver. car rating in pct. C-5 in A-2	Aver. difference between C.F.R. and car, expressed in equivalent octane units, basis 4 per cent C-5 equals approximately 1 per cent octane
RT-1	28.8	7.0
RT-2	0.8	0.2
RT-3	26.0	6.0
RT-4	29.0	7.0
RT-7	21.5	5.0
RT-8	—4.4	—1.0

The above results show that, on the basis of average ratings, two of the fuels ("RT-2" and "RT-8") showed behaviors in cars which were in fair agreement with their respective ratings by the C.F.R. procedure; but that four of the fuels ("RT-1," "RT-3," "RT-4," and "RT-7") on the other hand, knocked worse in cars than in the laboratory engine by the equivalent of from 5 to 7 octane units. This is the thing which by some has been referred to as the discrepancy factor. Cases of some other types of gasoline have been observed, and independently reported to the subcommittee, in which the discrepancy between the rating in the laboratory and that obtained in cars has consisted not in the car rating being lower than the laboratory rating, but higher. However, whichever occurs, the results observed appear to be an indication that present C.F.R. procedure does not conform closely enough to the conditions under which automobile engines are run in service to give results which approximate average car behavior in the cases of some gasolines, although it does very well in the cases of other gasolines.

With regard to the actual magnitude of the average results reported above, however, mention is again made of the important fact that they constitute nothing more than preliminary data. For the present, therefore, they should be considered as qualitative rather than quantitative in character.

It is important to note that none of the discrepancies reported invalidate in any sense the fundamental concept of octane number. Octane number is a universal language for expressing knock ratings obtained under certain specified conditions—under conditions which are uniform and carefully controlled. Strictly speaking, no other rating is an octane number. The conditions under which the octane numbers of fuels are now determined may not be right for all fuels, and apparently they are not; i.e., the conditions existing in laboratory tests are apparently not nearly enough like those which prevail in cars in service. However, that is not the fault of the octane number scale. The setting up of correct conditions under which to determine octane numbers is the problem now before the subcommittee.

Different Operating Conditions

The second phase of the work of the subcommittee consists of experiments in the laboratories of individual members, to evaluate the effects on the ratings of various types of fuels of changing different operating conditions on the present C.F.R. apparatus. The primary purpose of the road tests discussed above is to determine what ratings should be obtained. The purpose of the laboratory studies is to determine how such car ratings (when their proper values shall have been arrived at on the basis of comprehensive road tests) can be obtained with C.F.R. apparatus.

Accordingly, the various laboratories are studying the C.F.R. apparatus and method, to determine in a systematic and comprehensive manner the effects upon the ratings secured for fuels of various types of making changes in such representative factors as the following: Speed, jacket temperature, mixture temperature, mixture ratio, spark setting, throttle opening, valve timing, turbulence, exhaust back-pressure, and degree of scavenging, as well as various minor changes in the design of the engine and intake system. In addition to the investigation of the effects of making changes in one of the mentioned variables at a time, the different laboratories are experimenting also with making simultaneous changes in more than one variable. And it is this latter which has been found most effective in influencing the ratings obtained on fuels which in service depart from the conventional laboratory rating. It should be said also that some members of the subcommittee are experimenting with representative automobile engines, to see whether it is possible to modify them in such a way as to reduce the amount of the discrepancy that now exists between the ratings they give ad those obtained by the present C.F.R. technique.

Only a general statement as to the results obtained in these studies on the C.F.R. apparatus and method can as yet be made; but it can be said that data thus far reported by the various investigators indicate that knock ratings on any given fuel or series of fuels which are in fair agreement with the behavior of the same fuels in any given car, or with the average behavior for a number of cars, can be obtained by suitable modifications of the C.F.R. apparatus and procedure, and obtained possibly all under the same uniform set of test conditions. The test conditions referred to cannot now be definitely specified, however, because there is not as yet available sufficient information; first, on just what rating should be obtained for some types of fuels; and, second, on just what test engine variables it will be most advantageous to modify. However, at its meeting April 6 the subcommittee was of the opinion that no major changes in the C.F.R. unit will be necessary in order to correlate satisfactorily C.F.R. laboratory and road test results.

The point just mentioned is at once an important and an encouraging one, particularly from the viewpoints of those who now have C.F.R. knock-testing units in service and of those who may purchase them within the near future. At the time of the preparation of this report (April 12) there were in service 160 C.F.R. outfits. The majority of these were in the United States, but C.F.R. units were also in use in England, France, Germany, Poland, Russia, Italy, Egypt, South Africa, South America, Hungary, Australia and Czechoslovakia.

Current Program of Subcommittee

In the light of the above discussion, it is logical that the present work of the subcommittee should consist of the things on which it is now engaged, which are:

1. To work out the best possible road test procedure, and then to rate typical present-day gasolines in representative cars by means of it.

2. To find means of getting knock ratings on the C.F.R. unit which will predict the behavior of fuels in cars; and as soon as the work on cars shall have shown just what the ratings of the various types of fuels in the laboratory ought to be, to settle upon the best possible setting of the different variables for the C.F.R. apparatus to give those ratings.

RELATION BETWEEN C.F.R. KNOCK RATING AND CAR RATING FOR SIX DIFFERENT FUELS

Six Different Representative Gasolines Designated Below as RT-1, RT-2, RT-3, RT-4, RT-7 and RT-8 Were Compared With Blends of Two Standard Reference Fuels Designated as C-5 and A-2 in Both the C.F.R. Engine Operated in Accordance With the Present Standard Procedure for Knock Testing and in the Automobiles Shown Below

(The vertical bars indicate the range in ratings that was observed for each make of car and the heavy horizontal dashes [—] indicate each observation. The data obtained by each of the five co-operating laboratories are shown by the letters A, B, C, D and E, recorded beside each observation.)

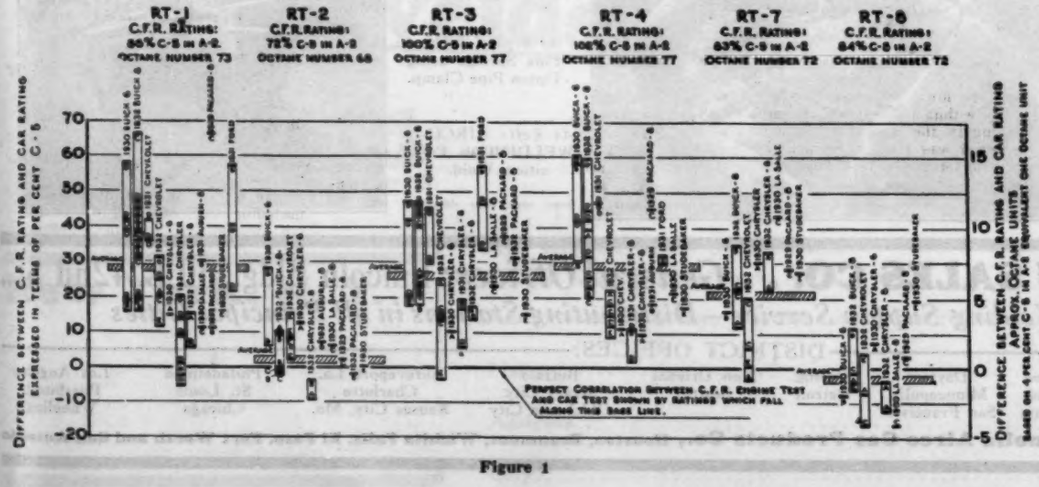

Figure 1

DEATH OF E. R. PITCHER

E. R. Pitcher, superintendent of production of the Cushing and Tonkawa districts, Oklahoma, for The Texas Company, died May 28. He was born in Hasking, Wood County, Ohio, on February 15, 1871, and had his early training as rig builder in the fields in Indiana, Ohio and West Virginia. Mr. Pitcher had interests in oil properties near Montpelier, Ind., until 1902, when he went with the Ohio Oil Co. in the production department and remained with that company at Marion, Ind., until 1914 when he came to Oklahoma to do construction work for the Producers Oil Co., a subsidiary of The Texas Company. He later was made superintendent of production for The Texas Company with headquarters at Eldorado, Kans., and since 1920, has been in charge of production for the same company in the Cushing and Tonkawa districts, Oklahoma.

DEATH OF MRS. H. H. STOW

Mrs. H. H. Stow, aged 95 years, died at her home in Toledo, Ohio, on Sunday, May 29. Mrs. Stow was financially interested in oil production in the northern Ohio fields, her late husband having been a prominent operator in that field from the early nineties until his death. The Stow estate has for many years been administered by a son-in-law, H. F. Crandall of Toledo.

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Cracking Hydrocarbon Gases and Reforming Low Boiling Point Oil

Market for Light Products of Refinery Must be Developed

By G. G. Oberfell and J. A. Guyer
Phillips Petroleum Co.*

Recent economic conditions, within and outside the industry, have combined to make it necessary seriously to consider other promising markets. A study of the present and potential markets reveals the following possibilities:

1. Direct utilization of liquefied petroleum gases, by which they are used without further processing in the gas-manufacturing, industrial-gas, and domestic-gas fields.

2. Motor fuel markets and gas industry outlets. Vapors and gases can be cracked with the simultaneous production of motor fuel for the gasoline trade and a gas for use by the gas industry.

3. Use of gas-reforming processes by the gas industries:

(a) Reforming hydrocarbons by passage through incandescent fuel bed in water-gas plants.

(b) Continuous process for producing reformed gas of comparatively high thermal value.

(c) Continuous process which may be used to produce a gas which will duplicate gravity and heating value of natural gas or present manufactured gases.

4. Markets in the chemical industries.

This paper is confined to a brief discussion of the economic importance of the above-mentioned markets and the ways and means by which they are being developed.

Direct Utilization of Liquefied Gases

The gas industry and the industrial and domestic fuel markets are important outlets for petroleum products. The coal industry provides about 60 per cent of the fuel requirements of the United States. The percentage supplied by the petroleum industry is only about half of the amount attributed to the coal industry, but the percentage contributed by petroleum products has doubled during the past decade. However, it is evident that there still remains a large potential outlet for liquid and gaseous fuels without incurring serious intercommodity competition within the petroleum industry.

The use of liquefied petroleum gases, such as propane and butane, has steadily increased from 1,100,000 gallons in 1927 to 28,500,000 gallons in 1931. The estimated potential supply of these products by the natural gasoline industry alone is 13,000,000 gallons daily. Since the investment in equipment and the major expense of producing a portion of the potential production are incidental to the manufacture of natural gasoline and motor fuel, the petroleum industry is justified in going to considerable expense and effort to create and develop markets for these gases. Marketers entering the field seem to fail to recognize that the main problem is to originate new markets in an unsaturated field. In most cases they resort to price cutting and other uneconomic practices prevailing in those businesses whose markets are practically saturated. It certainly would be to the best interest of all—and this applies to the producers of manufactured gas as well as it does to liquefied petroleum gas manufacturers—if the money lost by price cutting were used for research, engineering, and sales purposes in order to create and develop new markets instead of donating it to the old customers who are already sold on the advantages of gas.

Bottled Gases

Propane is rapidly becoming an important domestic fuel. The greatest portion of the progress made in finding markets for propane has been in suburban districts not supplied with natural or manufactured gas. This product comprises the bulk of the so-called "bottled gases." A large investment is required to exploit this business. Consequently, the importance of the investment overshadows the value of the fuel outlet.

The use of butane for enrichment of manufactured gas, to meet peak loads and to increase the capacity of gas-manufacturing equipment, has been rapidly extended during the last five years.

The butane-air system has made it possible to distribute gas in communities which are not large enough to support other established gas-making processes. The above-mentioned uses for liquefied petroleum gases have not by any means reached the saturation point. However, the physical properties of these gases (such as specific gravity and dewpoints) have set up limitations which in some specific instances narrow their fields of application. A number of gas-cracking and reforming processes have been proposed to overcome such limitations and thereby provide an even broader scope of utilization than is enjoyed at present.

Motor Fuel Markets and Gas Industry Outlets

The demand for increase in quantity and for improvement in quality of motor fuel has brought about several economic changes in the petroleum industry. One of these changes has been the increased production and the conservation of the lighter hydrocarbon vapors and gases.

Due to the many assumptions that must be made, any estimate of the quantity of hydrocarbon vapors produced by the petroleum industry is open to criticism. A recent estimation indicates that 349,000,000 feet of refinery vapors are produced per day by 62 major refineries in the United States east of the Rocky Mountains. In addition to this, there is immediately available from the natural gasoline industry a supply of 750,000 gallons daily of liquefied petroleum gas which will eventually find markets at competitive prices. These vapors and gases constitute a raw-material loss which represents a large item of the final manufacturing cost of motor fuel. This situation has been responsible for the wide spread and growing interest shown by refiners and natural gasoline manufacturers in the methods and equipment necessary for producing motor fuel from hydrocarbon vapors and gases. The geographical location, as well as the quantity and quality of this supply of these hydrocarbon vapors, places certain controlling limits on their proposed uses. An ideal market would be one which is capable of economic absorption of any future increase in their production. Gas-cracking processes capable of producing motor fuel having a high benzol content give promise of meeting this ideal situation, and in addition assist in filling the increasing demand for a gasoline of high antiknock value.

Equipment Needed

The equipment necessary for cracking hydrocarbon vapors to produce motor benzol (light oils) consists of a tube type of furnace, a reaction chamber, and a benzol light oil recovery system, with the necessary accessories such as pumps, recording instruments, etc. The hydrocarbon vapors to be cracked are heated to 1,300° to 1,400° F. in the tubes. During this heating period endothermic reactions take place which result in the formation of the maximum concentration of unsaturated hydrocarbon gases. The hot gases from the coils enter the insulated reaction chamber where the exothermic reactions take place, during which the benzol light oils are formed. These exothermic reactions may cause the temperature of the gases within the reaction chamber to rise 100° F. or more. The hot gases leaving the reaction chamber have a sensible heat content of approximately 85,000 B.t.u. per 1,000 feet. If the process is operated in connection with a refinery, this sensible heat can be used to preheat the charge going to the cracking stills, to top or preheat crude oil, or to crack oil by direct contact in the vapor phase. In most operations made in conjunction with the refinery, the benzol and other light oils produced by gas cracking will be mixed with the other refinery vapors. In such cases the benzol light oils will be recovered with the gasoline products, and no additional light oil recovery equipment will be necessary.

The gas resulting from the pyrolysis of hydrocarbon vapors and gases to produce motor fuel is in certain respects more useful to the gas industry than are the original hydrocarbon vapors. By means of a slight sacrifice in benzol light oil yield, a rather wide range in quantity and quality of the gas can be obtained. Gases ranging from approximately 0.45 to 0.75 specific gravity and from about 875 to 1,300 B.t.u. have been produced in commercial size plant operation. Operating conditions can, therefore, be adjusted to take full advantage of the relative economics of the two concomitant products. This favorable situation, as well as the flexibility of producing a gas whose properties can be varied through wide ranges, enlarges the field of utilization of the light hydrocarbon vapors.

The cracking of gases to produce motor benzol generally results in a volume increase of more than 100 per cent with an overall B.t.u. reduction of less than 25 per cent. The increase in hydrogen content of the cracked gas suggests a number of interesting uses in connection with refinery operations. The low boiling fractions of the benzol light oil and the unsaturated hydrocarbon content of the cracked gas, which are subject to the control of the process, represent a source of raw material for an extensive chemical industry.

Use of Gas-Reforming Processes by Gas Industries

(a) Reforming hydrocarbons by passage through incandescent fuel bed in water gas plants.

The reforming of hydrocarbon vapors has been applied to existing manufactured gas processes in various ways. Petroleum products, such as butane, are passed through an incandescent fuel bed in the blue water gas equipment. The decomposition of the butane is accompanied by the formation of saturated and unsaturated hydrocarbons, hydrogen and carbon—the relative proportions of these substances depending upon operating conditions. The heating value of the resulting gas mixture is controlled by varying the rate of butane throughput and by other changes in operating conditions. This reforming process increases the capacity of the water gas equipment and is, therefore, a distinct advantage in meeting peak load requirements by increasing the output of the existing gas manufacturing installations. Its disadvantage resides in its dependence upon the use of high investment in water gas equipment and the decrease in thermal efficiency of hydrocarbon utilization.

(b) Continuous process for producing reformed gas of comparatively high thermal value.

In some instances it is advantageous to the gas industry to have gas available which has a comparatively high B.t.u. content and which is not dependent upon already installed gas manufacturing equipment. In such cases, peak load requirements, seasonal maximum load demand and/or a standby process to insure uninterrupted service are the principal features to be considered. To meet these conditions the gas reforming process must possess a low installation investment, the raw material must be abundant, the storage cost for raw material must be low, the raw material must not deteriorate in storage, and the equipment must be so designed that the process can be put in operation on short notice. To supply this need a continuous hydrocarbon vapor reforming process has been developed that is continuous in operation and independent of all other gas manufacturing equipment. The thermal value and specific gravity can be controlled during processing to produce a gas that can be mixed with water gas, manufactured gas or natural gas to adjust its B.t.u. value as desired. This process can be used independently of other processes to supply a gas uniform in gravity and heating value where a gas of high B.t.u. content is desired. A hydrocarbon, such as butane, can be reformed to any desired B.t.u. value between 1,700 and 3,200 with a corresponding change in specific gravity. The predominating chemical reactions taking place during the reforming period are endothermic. A plant producing 8,000 feet of 1,700 B.t.u. gas per hour has been operated for 135 days without any trouble with carbon formation in the heating coil. All indications are that the process can be operated indefinitely without appreciable difficulty in this connection.

Reforming Equipment

The reforming equipment consists of a tube type of furnace of any proven design equipped with coils of heat resisting alloy. The apparatus is similar to that described above in the manufacture of benzol light oils. No catalyst or reaction chamber is necessary. The tubes and furnace must be designed to provide for the proper capacity and rate of heat input. The temperature of the reformed vapor at the exit of the furnace should be from 1,000° to 1,400° F., depending upon the type of gas desired. Tubes of 18-8 nickel-chromium alloy have been used successfully under these operating conditions. In a properly designed furnace the maintenance cost of alloy tubes is not prohibitive. Operation and control of the process to produce a gas of constant calorific value are simple. Inexperienced labor has operated this process with not more than 1 per cent variation in the B.t.u. value of the gas produced over a period of one week. This exactness of control of gas quality was accomplished without the use of a gas holder.

The concentration of hydrogen and unsaturated hydrocarbons in the reformed vapor increases as the reforming reactions progress. The unsaturated hydrocarbons reach a maximum concentration of 43 to 48 per cent when butane is reformed to 1,700 B.t.u. value. A typical analysis of such a product is shown in Table 1. A series of analyses taken during the reforming period show that the

*Before A.P.I. Division of Refinery, Tulsa, June 2.

concentration of the individual unsaturated hydrocarbons changes as the reforming progresses. If the reforming process is to be used as a source of unsaturated hydrocarbons for the manufacture of chemical products, the reforming conditions can be controlled so as to obtain the maximum yield of the desired unsaturated hydrocarbon.

TABLE 1—ANALYSIS OF REFORMED BUTANE

	Pct. by volume
Hydrogen	9.9
Methane	22.8
Ethane	4.2
Ethylene	25.2
Propylene	16.8
Butylene	4.4
Butane and heavier	16.7
Specific gravity	1.0
B.t.u. value	1,700

(c) Continuous process which may be used to produce a gas which will duplicate gravity and heating value of natural gas or present manufactured gases.

In addition to the desirable features of the process just described, the ideal gas reforming process should also be sufficiently flexible to produce a gas with a B.t.u. value and specific gravity corresponding to natural gas or to any of the existing manufactured gases. A gas process of this latter type would afford a direct substitute for natural gas and for manufactured gases; and, therefore, has a much wider field of application in the gas industry. In addition, there has been a long-felt need for a process that would make it possible to reduce investment costs per unit volume of gas delivered through high pressure transmission lines. For example, in order to supply natural gas to the ultimate consumer at as low a price as possible, and at the same time obtain the most satisfactory return on the investment, it is necessary to operate a natural gas pipe line at the highest possible percentage of its capacity. The demand for gas generally increases during the fall of the year, reaching a maximum in January or February with a corresponding decrease in the spring of the year. In some instances the peak demand for domestic fuel during the winter has been 400 per cent of the average summer demand. This situation will tend to become more serious as the space heating load becomes more fully developed.

New Gas Manufacturing Process

The natural gas pipe line companies have attempted to compensate for low load factors of their lines by selling gas to the consumer on a sliding scale by seasonal price changes and by low off peak load prices. Such devices distribute the burden between the pipe line companies and the consumer, but do not fully remedy the situation. A more satisfactory solution is to supplement the natural gas supply during the peak load periods by a gas manufacturing process which will duplicate the B.t.u. and specific gravity of the natural gas. A manufactured gas of this type can be mixed with natural gas in any desired proportion without materially changing the practical combustion characteristics of the natural gas. With the above-mentioned combination of conditions in mind, a new gas manufacturing process has been developed.

The equipment necessary for this process is a tube furnace with alloy heating coil similar to the gas reforming equipment described immediately above. No additional equipment, such as a reaction chamber, is necessary. The process is continuous, and is based on the combination of hydrocarbon reforming and water gas reactions. The combination of reactions is carried out simultaneously, and can be controlled to produce gas with a range of B.t.u. and specific gravity values wide enough to enable one to duplicate those properties of any of the existing natural or manufactured gases. A mixture of steam and hydrocarbon is passed through the heated coil containing a catalyst. By the proper control of the steam to hydrocarbon ratio, the temperature, time of contact, and rate of heat input gases ranging from 260 to 1,800 B.t.u. can be produced. The process can be successfully operated, using petroleum products embodied in the range of natural gas hydrocarbons, thereby insuring an abundance of raw materials which is an additional factor in broadening the fields of application. The results shown in Table 2 were obtained with the use of commercial butane as the raw material. Utility companies which distribute a mixture of natural gas and manufactured gas of low B.t.u. value, such as blue water gas, can increase their natural gas load factor during the summer months by using natural gas as a raw material in this new gas manufacturing process.

TABLE 2—ANALYSIS OF GASES MADE BY NEW PROCESS SHOWING ITS ADAPTABILITY FOR DUPLICATING QUALITIES OF OTHER COMMERCIAL GASES

Specific gravity	0.45	0.52	0.55	0.62	0.86
B.t.u. value (gross)	453	609	666	809	1,366
Carbon dioxide	7.3	2.6	6.4	5.0	4.6
Carbon monoxide	13.2	12.3	15.0	15.0	10.4
Hydrogen	55.4	47.7	44.9	42.6	38.1
Unsat. hydrocarbons	4.3	8.3	9.5	12.9	13.3
Paraf. hydrocarbons	14.9	27.1	24.2	23.5	33.6

Markets in Chemical Industry

The extension of the art of fractionation in the petroleum industry has made large quantities of relatively pure hydrocarbons of the paraffin series available for manufacturing chemicals. The extensive use of cracking processes, the development of vapor reforming processes, and the development of processes to produce unsaturated and aromatic hydrocarbons have increased the supply of raw materials for many chemical products. Although this outlet for hydrocarbon products is extensive in regard to the number of chemical compounds that can be manufactured, the actual quantities of the various hydrocarbon products which can be economically used are small in comparison with the supply.

One of the largest outlets so far developed for hydrocarbons in the chemical industry has been the production of carbon black. The channel process using natural gas continues to produce the major portion of the carbon black used. This process is repeatedly accused of wasting natural resources. Natural gas conservation measures are becoming more restrictive, and the problem of an adequate supply of natural gas for carbon black may before long become a serious one if the quantity of natural gas profitably distributed by pipe lines continues to increase. In the past it has been necessary for the carbon black industry to locate its plants in the field where the natural gas is produced. The development of gas cracking and vapor reforming processes will have a marked effect on this situation. Actual experimental results have shown that a very satisfactory carbon black can be made by using butane in the channel process. It has also been found that the actual quantity of carbon black produced per unit volume of hydrocarbon vapors can be increased by reforming the vapors prior to their use in the channel process. It has also been shown that a heavy hydrocarbon vapor, such as butane, can be cracked to produce concurrently benzol light oils and a resulting gas—which after extracting the benzol—can be used to manufacture carbon black giving a yield equal to that capable of being produced from the original vapors. The results of these investigations reveal that the future of the carbon black industry is not dependent upon the abundant supply of natural gas, and that any prohibitive legislation in regard to natural gas need not limit carbon black production.

Benzol will continue to find its major outlet in the motor fuel field. However, the quantity of benzol used in the chemical industry is large and growing. The nation's supply of benzol and toluol during war is highly important. The development of a process to produce these compounds from petroleum assures an ample supply in case of a national emergency.

In general, the demand for special petroleum products by the chemical industry will affect individual companies more than the industry as a whole. Certain individual companies will find themselves in a position advantageously to supply certain products. It is important that these individual companies fully recognize this situation, and develop markets for special products accordingly.

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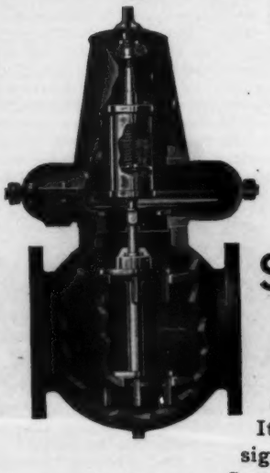

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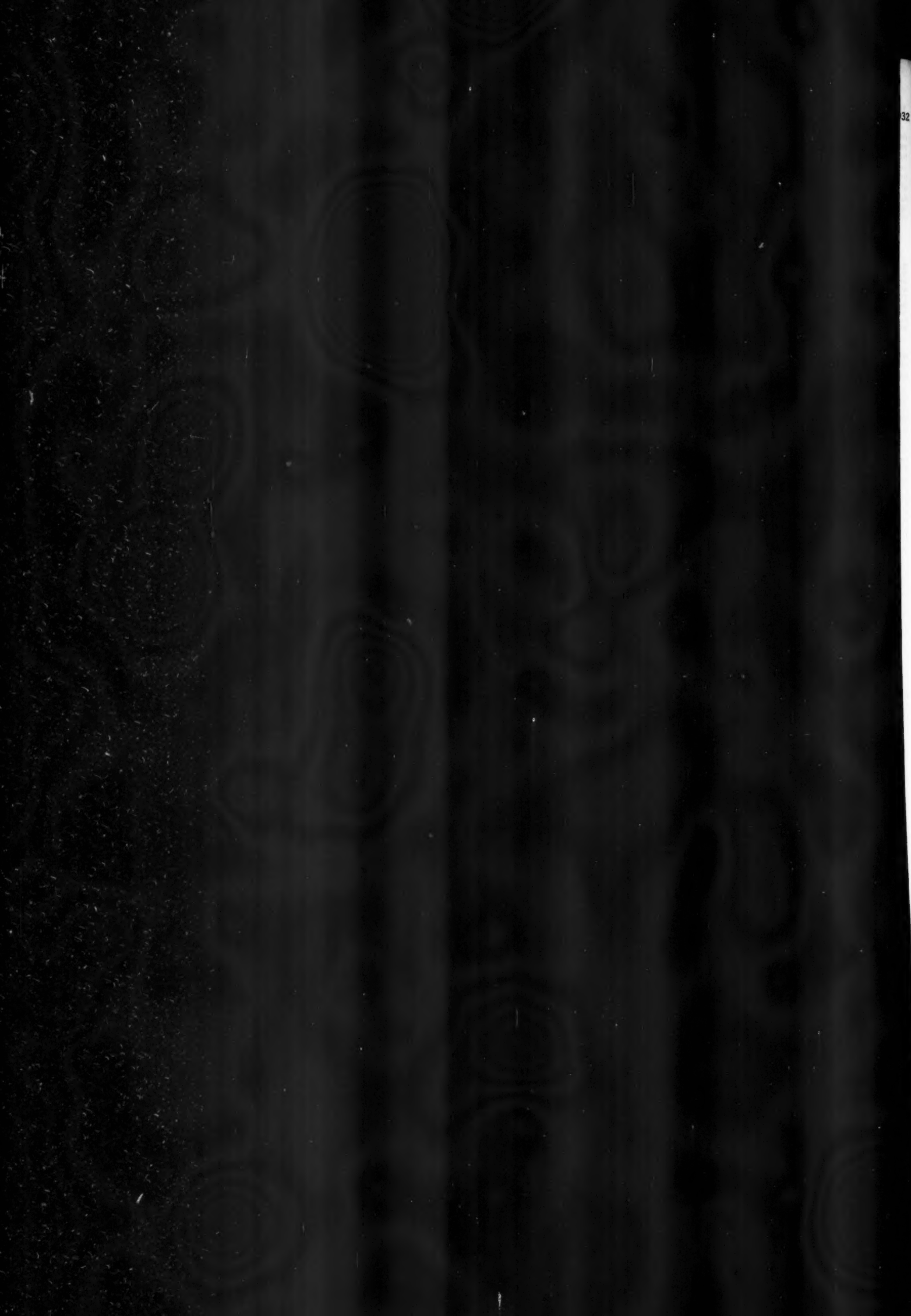


Natural Gas Industry Developments

ODORIZE GAS SUPPLY IN EDMONTON, ALTA.

CHATHAM, Ontario, June 4.—For the first time in Canada, experiments will be commenced this summer by Northwestern Utilities, Ltd., of Edmonton, Alberta, looking to the odorization of the entire Edmonton gas supply, with a view to protection of consumers by quicker leak detection. The city's supply, an entirely odorless gas, is drawn from the Viking Field in east-central Alberta. An announcement by Julian Garrett, general manager, says:

"In accordance with its general policy of furnishing its consumers with the most up-to-date and efficient service possible, the company has been carefully enquiring for some time past into the feasibility of odorizing the Viking gas.

"It will, during the summer, carry on various experiments in odorization. If they are successful, the gas will continuously or periodically be odorized in the hope that it will facilitate the discovery of small leaks, particularly in heating and cooking appliances, which sometimes now escape detection. The necessary equipment has been ordered, and should arrive shortly.

"So far as I know, this will be the first time that an attempt has been made in Canada to artificially odorize natural gas, although odorants have in recent years been more or less successfully used in a few places in the United States.

"Climatic conditions in Edmonton present certain problems which are not as difficult to the south. During winter months the temperature of the gas is considerably below freezing. With low temperature the problem of satisfactory odorization is one of finding an odorizing liquid which can be completely vaporized and so mix with the natural gas in sufficient quantity. If it were not completely vaporized, precipitation in the distribution mains would result and probably cause obstruction or corrosion and at the same time sufficient of the odorant would not be carried in the gas to achieve the desired purpose.

"Another problem is the fact that the higher the pressure of the gas, the lower the volatility of the odorant. To odorize the entire system of Edmonton at one point requires that the odorant be injected at the main regulating station at the entrance to the city. The pressure here is 40 pounds.

"We have two difficult factors, therefore, for successful and economical odorization, i.e., low temperature of the gas and high pressure. In order not to use more odorant than can be completely vaporized and still accomplish the desired results, the odorant selected must have a very distinct and penetrating odor. It must also be harmless, insoluble in water, and must burn to harmless and odorless products.

"Still another problem is the automatic regulation of the injection of the proper proportion of odorant to gas as the consumption increases or decreases.

"The first test will, therefore be made during mild weather, and they will be continued until the efficiency of odorization can be determined one way or the other. During the tests various odorants will be used. At the present time Imperial Oil, Ltd., is experimenting with a formula. This, as well as other products, will be tried."

PLAN MUNICIPAL PLANTS

A bill has been introduced in the Louisiana house to authorize municipalities to engage in the production and sale of natural and artificial gas and to secure funds for such purpose by issuing bonds secured by a tax or by mortgages on the property and the pledge of the income.

NEW HEARING HELD ON RATABLE TAKING

AUSTIN, Tex., June 6.—The Railroad Commission held a hearing in ratable taking controversy styled R. B. Masterson Estate vs. Canadian River Gas Co., which involves, for the first time, the correct method of taking gas from two adjoining leases in the same field, whether it should be based on the total acreage leased or the acreage of proven gas production. A former hearing held under the new ratable law presented the allegation that the gas company was taking gas from one lease and refusing to take it from others nearby. The present case involves the charge that the pipe line is taking a smaller share of the Masterson gas than its acreage demands under ratable taking.

According to the exhibits the Masterson estates has 98,242 acres with 18 wells leased to the Canadian company in the West Panhandle Field in Potter and Moore Counties and the Lee Bivins estate has leased the same concern 218,000 acres. Other leases bring the Canadian's total to 400,000 acres and in the last four years it has run some 34,000,000 feet of gas, supplying Chicago, Denver and outside points besides Amarillo and other Texas cities.

The Masterson estate claims its land is in the apex or heart of the field and is capable of producing enormous quantities of gas, but that the Canadian has consistently reduced takings from above 75 per cent to 22 per cent at this time, while it has raised its taking from Bivins.

Masterson asks that the company be required to take 33 per cent of the field output from his wells and the company claims it is taking 39 per cent.

Masterson contends that a geological fault extends across the southern part of the field from northwest to southeast and that no gas is found south of that line. This, he avers, makes 147,000 acres of nonproductive land and of it 16,000 belong to Masterson and 131,000 to Bivins, leaving proven producing land of 82,000 acres to Masterson and 87,000 to Bivins. It is on this showing that Masterson asks for an order raising his takings to 33 per cent of the field.

It is alleged by Masterson that his gas is being drained without being paid for, that the unratable taking is causing waste by the reduction of the rock pressure and that discrimination exists.

NEW HEARING FIXED ON PANHANDLE GAS

AUSTIN, Tex., June 6.—The railroad commission has issued notice of hearing June 6, on the application of F. C. Henderson, Inc., for a permit to utilize natural gas produced in Hutchinson County, under the provisions of a law passed by the Forty-second legislature wherein it is provided natural gas shall be utilized for light and fuel, but the commission may permit the use of such gas for other purposes which under the circumstances surrounding each particular case might be found by the commission after hearing to be practical and conducive to the public welfare.

This is an added chapter to the Henderson case in which the defendant claimed its plant in the West Panhandle gas field was using gas from natural gas wells for the manufacture of gasoline only when the gas pipe line companies refused to purchase gas from its clients. The State through the railroad commission and the attorney general's office, won the suit and the plant was closed down.

Since the suit was started the gas pipe line companies have attacked the common purchaser act and the commission has asked the attorney general's department for a ruling on whether it could authorize the use of dry gas in producing gasoline and carbon black even though it comes from a well which is not classed as an oil producer, under the last provision of the law.

The application by the Henderson company follows a similar application recently made by Hagy, Harrington & Marsh, of Amarillo, Tex.

BRITISH GAS EXECUTIVES AND ENGINEERS COMING

A large group of British gas executives and engineers will visit the United States and Canada next year for a tour of the two countries and to attend the annual convention of the American Gas Association. R. W. Gallagher, president of the latter organization, with Hugh McNair of Winnipeg, president of the Canadian Gas Association, extended an invitation to the British.

J. R. W. Alexander, secretary of the British Institution of Gas Engineers, has advised American Gas Association headquarters that the council of his organization, in accepting the invitation, plans to be here in September and October, 1933, with numerous gas men from England, Scotland, Ireland and from the Continent, in many cases accompanied by their wives.

While the event is more than a year away, preliminary arrangements already are being made by leaders of the gas industry of the United States and Canada to receive and entertain the visitors.

GAS UTILITY SALES IMPROVE

Revenues of manufactured and natural gas utilities aggregated $62,009,931 in March, 1932, compared with $64,318,405 in March, 1931, a decline of 3.6 per cent, according to reports from 406 companies serving 14,039,322 customers and representing over 90 per cent of the public utility distribution of manufactured and natural gas. This represents the smallest decline in revenues since May, 1931, and indicates a distinct improvement during the first three months of the current year.

The manufactured gas companies reported a drop of 2 per cent from a year ago, while revenues of the natural gas concerns totaled $28,823,626, or approximately 5 per cent less. Sales of manufactured gas showed a decline of less than 1 per cent, while natural gas sales showed a drop of 8 per cent.

A substantial part of the improvement in manufactured gas sales was due to greatly augmented use for househeating.

Throughout the country generally, industrial gas sales, both for manufactured and natural gas utilities, continued at levels considerably below the preceding year, the decline in sales of manufactured gas for industrial purposes approximating 9 per cent, while industrial sales of natural gas were down nearly 9 per cent from March, 1931.

NEW VOTE AT GUTHRIE

Mayor H. T. Anderson has set September 20 for another election in Guthrie, Okla., on the right of the Guthrie Gas Service Co. to continue business for 25 years. The company recently filed petitions with 1,855 signatures demanding an election. Under a competing franchise the Western Service Corp. began business in Guthrie last fall after signing about 60 per cent of the city's customers at a reduced rate. The Guthrie Gas Service Co. is now charging 43 cents per 1,000 feet and the Western Service Corp., 44 cents. Under the proposed new franchise the old company offers a 38-cent rate.

OHIO GAS PRODUCERS PROTEST COUNTY TAX

ZANESVILLE, Ohio, June 4.—At a preliminary meeting of natural gas producers of Ohio, held here, the recent action of the county auditors of Ohio raising the taxes on natural gas 50 per cent, while they were reducing taxes on all other classes of property, was bitterly arraigned by the gas producers. They mean to fight this advance through the courts if necessary.

George A. Hoover, Brendel Brothers Gas Corp., of Canal Fulton, was chosen chairman. Philip N. Faine, secretary, Penna Grade Oil Producers of Ohio, was made secretary.

The following gas producers were present:

W. H. Atha, Zanesville; W. H. Holtz, Cleveland; A. E. Faine, New Straitsville; C. C. McClay, Zanesville; W. E. Burns, Marietta; J. M. Geisinger, Millersburg; H. D. Atha, Logan; George B. Archer, Zanesville; John Moser, Sistersville, W. Va.; L. C. Reid, Charleston, W. Va.; I. C. Grimm, Woodsfield; H. O. Burkhart, Zanesville; E. Sargeant, Logan; George A. Hoover, Canal Fulton; W. L. Franks, Logan; W. J. McClay, Newark; H. M. Brown, Pittsburgh, Pa.; J. M. Speary, Marietta; W. Palmer, Millersburg; George E. Weiring, Pittsburgh, Pa.; W. E. McIntire, Newark; E. Hite, Zanesville; T. K. Harris, Canton; H. E. Buker, Zanesville; Harry Mann, Mount Vernon; Philip N. Faine, New Straitsville.

Mr. Hoover said: "The recent action of the county auditors was unjustified. The appeal of the gas producers to the tax commissioners of Ohio fell upon deaf ears. The plea of the individual producer goes unheard and the necessity for an organization of the gas producers to fight for fair treatment is imperative."

A. E. Faine, statistician of the Penna Grade Oil Producers of Ohio, recited the experience of the oil men in building up their organization and told of the benefits derived. He illustrated the tax imposed upon gas by saying: "The gas producer drills one dry hole out of three. He drills many of these wells more than 3,500 feet deep. When he develops 1,000,000 feet per day and sells the same at 15 cents per 1,000 feet at the well it brings him $150 per day or $54,750 per year gross income, out of which he must pay all drilling expense including dry holes; he must furnish all necessary equipment and operate the wells. He has taxes to pay and losses by breaks and leakage to stand, all of which comes out of the gross amount of $54,750, and the auditor has put his property on the tax duplicate at $90,000, making the gas producer pay the highest tax in the United States."

EXTEND NORTH PENN MARKET

WELLSBORO, Pa., June 4.—Industrial improvements of the communities served, and an extension of the market of the North Penn Gas Co., is the aim of a new service instituted here recently.

M. G. McCarney will make an industrial survey of communities served by the North Penn in conjunction with chambers of commerce. Meetings have already been held in Elkland and Westfield, Pa., and similar meetings will be held in all towns served by the company.

TO DRILL 10 WELLS

CASPER, Wyo., June 6.—Max J. Kaplan, president of the Lakota Oil & Gas Co., states the Lakota has authorized drilling of 10 wells for gas should the company receive a contract for supplying Casper.

Well Spacing Problems Are Considered

Committee of A.P.I. Makes Valuable Contribution to Industry in Reports at Mid-Year Meeting Held in Tulsa

By L. G. E. Bignell
Petroleum Engineering Editor

The technical sessions of the American Petroleum Institute Division of Production got under way at the mid-year meetings held in Tulsa June 1-3 with a report of the central committe on drilling and production practice by W. W. Scott, Humble Oil & Refining Co., Houston, Tex., on Thursday morning, June 2. This first meeting was devoted to well spacing and Mr. Scott said that the "function of this committee is to encourage the analysis, presentation and discussion of technical and practical phases of drilling and production problems." It is promoting three major studies at the present time, as follows:

(a) Well spacing, under chairmanship of Fred E. Wood, Standard Oil Co. (Indiana), Chicago.

(b) A study of rotary drilling fluids; chairman, J. R. Gignoux, Shell Oil Co., Los Angeles, Calif.

(c) Effect of proration on ultimate recovery;. chairman, Harvey Hardison, The California Co., Dallas, Tex.

After Mr. Scott had made his report, which outlined the progress made by these several committees during the past year, the meeting was presided over by Fred E. Wood and a symposium on well spacing presented.

Symposium on Well Spacing

In the opening paper on "The Problem of Well Spacing" Mr. Wood said in part:

"The well spacing problem divides itself into three natural divisions:

"1. The effect of delayed drilling on ultimate recovery.

"2. The effect on ultimate recovery of varied spacing of wells in a field completely developed in its early productive life.

"3. The economics of any well spacing program."

Mr. Wood went on to point out that there are many cases which indicate that wells drilled late in the productive life of a field actually decrease ultimate yield. Reduction in ultimate recovery is indicated by the fact that often surrounding wells are robbed of more production than the amount of initial production of the delayed well. No addition drilling should be done in a field which has been developed in accordance with present practices as to spacing, once interference has set in.

In the second division of the problem the following factors accurately, and others within reasonable limits, can be determined:

Amount of oil and gas produced; depth of well and thickness of saturated sand; bottom hole temperatures and pressures, and average porosity and permeability of a sand.

There is always considerable doubt about the following factors. Amount of pressure required to drive oil and gas through sands or resistance to flow; drainage area of a well particularly in sands which do not have uniform porosity, and include impervious beds; amount of saturated sand which yields recoverable oil; size of interstices in a sand; amount of gas coming out of solution in a sand, and velocity and viscosity of oil and gas mixtures in a sand.

Mr. Wood then quoted from the work of Prof. L. C. Uren presented in a paper published in the Transactions of the A.I.M.E., October, 1931, dealing with the amount of pressure required to flow oil and gas mixtures through a sand body. Part of Doctor Uren's conclusions were published in a report of the A.I.M.E. Houston meeting in the October 8, 1931, issue of The Oil and Gas Journal.

Reducing Poiseuille's law to simple terms the following may be stated:

"At any one time the viscosity of the mixture of oil and gas may be considered to be a constant within reasonable limits. In view of this, the quality $\frac{CZ}{D^3}$ in a given sand may be considered a constant, for all practical purposes. The formula is then reduced to $P = C\ L\ V$ or in other words the pressure varies as the product of the distance of the movement times the velocity. In simpler terms, and excluding certain factors, to move the oil twice the distance requires twice the pressure or to move the oil twice as fast requires twice the pressure. If the flow of oil and gas is viscous throughout its movement this relationship is fundamental for a given sand. No matter what form the equation for flow of oil and gas may take, this relation will necessarily apply, although there are many other factors which will tend to modify its effect, such as gas slippage, changing viscosity, varied sand conditions, etc."

From these general premises Mr. Wood constructed a graph showing per cent of pressure required to drive oil through a uniform sand to a well.

Cover Different Areas

Following Mr. Wood papers on well spacing in various areas were presented, the first being by A. S. Hayes, General Petroleum Corp., Los Angeles, Calif., in which he gave the following figures showing estimated ultimate recovery by zones of two areas developed under different well-spacing programs in the Santa Fe Springs Field, California:

	Buckbee zone		O'Connell zone		Clarke zone	
	Tract A	Tract B	Tract A	Tract B	Tract A	Tract B
Area in acres	35.8	40.0	35.8	40.0	35.8	40.0
Total wells in zone	30	9	40	7	42	8
Spacing per well—acres	1.19	4.44	.89	5.71	.85	5.00
Total production January 1, 1932:						
Per well	131,291	291,596	255,032	526,364	124,380	245,844
Per acre	110,020	65,609	284,952	92,114	145,921	49,169
Wells producing January 1, 1932	9	3	18	7	21	3
Potential January 1, 1932	725	690	3,757	6,180	1,367	1,370
Estimated future production	427,000	550,000	1,684,000	2,190,000	500,000	500,000
Estimated ultimate production:						
Per well	145,524	352,707	297,131	839,221	136,285	308,344
Per acre	121,947	79,359	331,991	146,864	159,887	61,669
Ratio of recovery	1½		2.3		2.6	

The area under discussion covered the three lower zones of the Santa Fe Springs Field only, which are the Buckbee, O'Connell and Clarke zones, and in a summary of the above tabulation Mr. Hayes pointed out that of 112 wells in the A townsite area of the three zones the estimated total yield per acre would be 613,825 bbls., while for the 24 wells in the B townsite area the ultimate yield would only be 287,892 bbls. per acre, of the ratio of 2.1 to 1 in favor of the closely drilled area.

In a discussion following this presentation of data for the Santa Fe Springs area, A. C. Rubel, Union Oil Co. of California, pointed out that a check of the total amount of oil recovered from closely spaced wells will show that the yield is greater than the theoretical amount of oil that could be contained in the given sand. This seems to indicate a drainage of oil from adjacent areas and this is quite common to town-lot drilling practice where every operator is concerned primarily with getting the greatest amount of oil in the least possible time regardless of ultimate recovery or effect upon adjacent leases. This will modify to a great extent the indicated recovery as set forth in the above figures.

In line with the recent decision of the U. S. Supreme Court in the Champlin case, this practice of draining adjacent leases is contrary to property rights in a common pool and only serves to prove the need of proper well spacing and regulation of production rate so that each owner of property rights in the pool can be protected and receive equal shares of the oil. While this may not be agreed to by those interested in small blocks of land in a field, it is in keeping with the spirit of the law as interpreted by the Supreme Court and it may be necessary in future activities to restrict close spacing of wells for the good of the greatest number of people interested in the pool and for the greatest ultimate yield of oil for all.

East Texas Field

Following this paper, R. S. Christi, Amerada Petroleum Corp., Longview, Tex., presented a paper on "Drainage Radii in East Texas, as Indicated by Reservoir Pressures."

In part, Mr. Christi stated that there has been very little if any real attempt made at well spacing in the East Texas Field based upon securing ultimate maximum yield of oil. This is because the area is very large, divided among about 600 operators with tracts varying in size from a fraction of one to several hundred acres. Wells have been drilled, and will continue to be drilled, largely to accommodate offset requirements, and at this time there are about 6,000 wells in the area of more than 120,000 acres, or about one well to each 20 acres. Mr. Christi advanced the opinion that there may be another 6,000 wells drilled in the East Texas Field, or an average of one well to each 10 acres of surface area.

There are three distinct zones of production in East Texas, a thin sand with shale breaks on the extreme western edge, a thick sand in the center, and another thinner section on the eastern edge of the field. These various zones would require different treatment as to well spacing if all conditions looking to greatest ultimate recovery were considered.

From work that has been done in this field with bottom hole pressure gauges it is now felt that these data can be applied to well-spacing problems with very good results and will result in securing a greater yield per acre, as well as less drilling, in many pools.

The Bell-Grady well when on fire and running wild affected bottom hole pressures in wells as far as 3,000 feet away from it. This drop in pressure was very noticeable in wells close to the wild well, but all pressures built up again quite rapidly after the well was brought under control and shut in.

From these facts it is reasoned that wells in this particular area have an effect upon bottom hole pressure conditions over a large radius, and therefore there is sufficient energy in this particular sand body to deliver all of the recoverable oil to a few wells if this program had been set up before the area had been drilled.

This condition has also been found to exist in the Joiner area in the south part of the pool where a well making 5,000 bbls. of oil per day caused an offset well to drop to zero bottom hole pressure. In a recent test under the supervision of the Texas Railway Commission one well flowing at various rates from 75 to 5,000 bbls. per day caused a pressure drop of 65 pounds in offset wells within 100 hours. Wells at 2,000 feet distance from the well under open flow test had a drop of 6 pounds and other offset wells located from 75 to 200 feet from the test well showed noticeable pressure drops.

Another interesting fact developed by bottom hole pressure gauge tests was that in some wells flowing at the rate of 100 bbls. per day the pressure showed a slight increase above normal when the gauge was first run. In other wells a drop of as much as 100 pounds per square inch was noted as they were produced. Wells along the east edge of the field have shown as much as 500 to 600 pounds drop while flowing at the rate of 100 bbls. per hour. The effect of this pressure drop on offset wells was not stated.

It was stated that variation in bottom hole pressures have a direct relation to porosity and permeability of sand. Different parts of the field will show marked difference in flowing conditions and bottom hole pressures. The amount of gas in saturation in the oil also has a marked effect upon the bottom hole pressure differentials because of tendency of gas to come out of solution as pressures are lowered below critical points.

Areas Compared

Mr. Wilde presented some interesting observations on conditions in different parts of the East Texas Field taken from results of bottom hole pressure gauge readings.

Data assembled indicate that bottom hole pressures are very much the same in zones of production in new and old wells and therefore the original reservoir energy is being drawn upon at about equal rates from all parts of the sand. These data may lead to future application in well spacing because it now seems that close spacing is not necessary in some sand pools in order to secure best ultimate recovery. In fact, many fields show that the later drilled wells have added nothing to ultimate recovery and have perhaps retarded the maximum amount of oil being secured because they have dissipated part of the energy of the reservoir unnecessarily.

Hydrostatic Pressure Important

C. V. Millikan, Amerada Petroleum Corp., Tulsa, stated that in considering reservoir energy the water under hydrostatic pressure existing close to the oil in the sands should be given credit for providing a medium for maintaining and even recreating bottom hole pressures. This water energy is very important in the problem of ultimate recovery as in fields where it is now known that the oil was recovered by gas energy only and no water drive was effective it has been found that the yield was only from 12 to 15 per cent of the total original oil in the reservoir.

As a comparison it has been found that pools where the oil was driven to the wells by combination of gas and water energy the recovery has been from 40 or 50 to in some cases as high as 70 per cent of the original amount in the reservoir.

Mr. Millikan therefore believes that in considering well spacing problems it is essential that water under hydrostatic head must be considered and Mr. Wood also stated that there were three types of energy to be considered in well spacing problems, gas alone, water alone and combination of gas and water drives. In the Burbank Pool, Oklahoma, where there

was an original rock pressure of 1,200 pounds, it is now estimated that the ultimate recovery will not exceed from 12 to 15 per cent of the oil in the reservoir because of lack of water movement through the sands. Contrary to this in the Stroud, Oklahoma, Pool, Tonkawa deep sands and Seminole Wilcox sands recoveries have been much higher and water has aided in producing the oil.

Mr. Millikan showed a graph of bottom hole pressures taken on seven wells in the Seminole area drilled in 1930. This indicated that the first well drilled on the lease had a much higher sustained bottom hole pressure from time of completion to date than four other wells drilled much later but to the east of it. A fifth well drilled north of the No. 1 well on the lease, but at a much later date, had about the same bottom hole pressure as No. 1 well when completed, and a well placed between No. 1 well on the west side of the lease and No. 2 well on the east side showed an intermediate bottom hole pressure when completed about 12 months after No. 1 well was drilled.

These data all indicated quite clearly that the water drive from the west, which caused water to put in its appearance in the two west side wells, had its effect upon maintaining bottom hole pressures and therefore must be considered in well spacing and ultimate recovery.

These general conclusions are substantiated by an accumulation of data from a number of areas and in six tested fields where bottom hole pressure readings have been obtained in sufficient number to permit conclusions to be drawn it is shown that repressuring by flooding is under way. In another field where similar tests have been made it is shown that lack of water drive has reduced the amount of oil recovered which is considered as negative evidence of the benefits to be derived from properly controlled water movements within the sands.

Rocky Mountain Region

The last paper of the morning was presented by J. J. Zorichak, Midwest Refining Co., Midwest, Wyo., and covered conditions in several pools and fields in the Rocky Mountain region.

The Greasewood Field, Colorado, was first considered and a production curve showed very clearly the effect of subsequently completed wells upon the discovery well. No. 1 Patterson, the first well completed, showed a drop of from 300 bbls. to 124 bbls. per day production when the second well, No. 1 Ida Johnson, was completed in August, 1931. No. 1 Patterson was drilled deeper and showed an increase in production, but when the third well was completed both the first and second wells in the pool showed marked decreases in daily rate of flow.

Extending the decline curve for No. 1 Patterson under conditions of normal production, without other wells draining the pool, indicates that the ultimate recovery would be greater than it is now anticipated with three wells completed.

An example of maintained rate of production and even some increase in daily flow in an isolated well was given by study of curve of Midwest Refining Co.'s No. 22 L. W. Gregory in the Jal, New Mexico, Pool. This well had an initial production of 92 bbls. of oil and 8 bbls. of water and almost three years later was making 100 bbls. of oil and about 15 bbls. of water. The nearest well is about three-fourths mile away.

Dutton Creek Field, Wyoming, has an isolated well that had an initial production of 50 bbls. per day from the Muddy sand at 4,876 feet and continued at this rate through 1930 and into 1931 when mechanical trouble developed. The well made some water which evidently had some effect upon rate of flow.

The Hogback Field in New Mexico is an example of wide well spacing with seven wells on 160 acres or about one well to each 23 acres. This field was put on production in 1924 with four wells completed and during the greater part of its life had produced about 400 bbls. of oil per day. All wells are still flowing under back pressure and to January 1 the field had produced 8,250 bbls. per acre. The reservoir energy is mostly hydrostatic as there is little effective gas drive. If the wells were opened fully they would produce considerable water, but they are pinched just enough to hold back water and produce clean oil.

Another noteworthy example of efficient production is the Sundance horizon in the Iles Field, Colorado. There are eight wells in this pool which have a productive area of 480 acres, or one well to each 60 acres. Back pressure has been maintained on the sand by producing the wells through one-eighth and one-fourth-inch beans. The wells have produced for about 4½ years with little decline in flowing pressure or production rate. The gas-oil ratio is roughly 400 cubic feet per barrel of oil. Decline in flowing pressure is attributed to hyrostatic head being maintained on the reservoir in water in the lower part of the sand. It is doubtful if any additional drilling will increase ultimate yield.

The First Wall Creek sand in the Salt Creek Field provides an interesting study because of the completeness of the records and slowness of development. The first well was completed October 23, 1908, with an initial production of 200 bbls. Development and production was started in 1911 and at the end of that year 13 wells were completed.

The peak of production was reached in 1915 with 88 wells making a daily average of 10,570 bbls. Analysis of chart shows that wells drilled after September, 1926, did not increase the daily average production to any appreciable extent, and the natural deduction would be that the last 50 wells drilled will not increase the total ultimate recovery greatly.

The sand is fairly tight and yields its production slowly. Paraffin accumulations on the face of the sand or some other condition has caused some wells to decline to a low point, necessitating shooting, after which many of them increased production as much as 100 bbls. per day. In this producing zone it is not thought that it has been greatly overdeveloped, even though the spacing had to conform to the requirements, because the sand is very tight and gives up its oil slowly.

In the Third Sundance sand in the Salt Creek Field there are about 660 acres productive and wells are spaced about one to each 29 acres, or a total of 23 wells are producing from this horizon. The last 13 completions in this horizon did not seem to straighten out the curve nor increase the daily production. The flowing pressure has declined from 700 pounds in January, 1928, to approximately 200 pounds in February, 1932. The expelling force in this sand is combination of gas and hydrostatic pressure.

Situation in Montana

Pondera Field in Montana has 27 wells in the pool or about one well to 10 acres. A wider spacing in this field would have drained the pay zone efficiently and the decline in production has been quite rapid under the existing conditions.

Cat Creek Field, Montana, indicates by study of the graph that the last 70 wells drilled there neither increased the production nor maintained the curve trend. The peak of production was reached in October, 1922, with 97 wells. The curve from this point has been very uniform with minor fluctuations. This is one of the most intensively developed field in the Rocky Mountain region, having 164 wells to 725 productive acres, or a well spacing of 4.5 acres per well. The chart indicates that the field could have been drained fully with one well to 10 acres.

A study of Rock River Field in Wyoming indicates that after 47 wells had been completed, the drilling of 19 additional wells did not increase production. After all drilling ceased in August, 1928, the decline in daily production was more rapid. The field seems to be overdeveloped by about 15 wells. There are 66 wells, or one well to 20 acres. Production is found in three sands of the Dakota series, the Muddy, Dakota and Lakota.

In conclusion, Mr. Zorichak states:

"In general, it may be stated that when a field reaches that state of development when additional wells do not increase the production nor arrest the decline, each additional well drilled simply takes away production from wells already producing.

"High initial production indicates the ability of oil to move through a reservoir readily. Spacing can be wide under such conditions.

"Low initial production with high bottom hole pressures may indicate a tight reservoir, where relatively closer spacing may be necessary."

Stress Need of Continued Curtailment

Statistical Data and General Industrial Conditions Point to Necessity of Fitting the Cloth to the Pattern

By James McIntyre

Diversity of estimates as to consumption of refined products in 1932 was a feature of the general session of the production, refining and marketing divisions of the American Petroleum Institute at the midyear meeting of the Institute in Tulsa. The general session was held on Thursday afternoon, June 2, and the audience filled the large Crystal Ballroom of the Mayo Hotel. W. R. Boyd, Jr., executive vice president of the Institute, presided.

In the address of President Amos L. Beaty, which was reproduced in part in The Oil and Gas Journal of June 2, Mr. Beaty said "the statistical committees will make their own forecasts. In the past they have been very close to results. My own opinion is that we shall be very fortunate if our domestic consumption and exports of gasoline for the last nine months of 1932 are within hailing distance of the estimates. From what I have heard and seen I would, without any claim of statistical skill, estimate a decline of 15 per cent." Mr. Beaty said he was supported in this statement by members of the board of directors of the Institute who had discussed the subject earlier in the day. He complimented the work of the statisticians who had made up the estimates of the Federal Oil Conservation Board and the American Petroleum Institute and explained that, of necessity, both committees worked up their figures on the basis of past records, but, Mr. Beaty said, reports on general business conditions in the very recent past made it necessary in his opinion to revise the estimate.

The committee for the Institute estimated the decline in domestic demand as at least 6 per cent, and the committee for the Oil Conservation Board at 5.4 per cent. The total demand for motor fuel, which is a combination of domestic and foreign demands, was estimated by the Institute's statistical committee at 6.6 per cent less than for the corresponding period last year, while the report of the Federal Oil Conservation Board's committee placed it at 6.2 per cent. Mr. Beaty emphasized the estimate of 15 per cent decline to warn the industry of the changed condition that confronts it and the necessity of providing means to take care of an unexpected situation.

Roeser a Conservationist

Charles F. Roeser, of Roeser & Pendleton and chairman of the division of production of the American Petroleum Institute, came out with a strong plea for continuance of curtailment of production as long as curtailment is necessary and charged the refining end of the industry with a lack of co-operation in the effort of the industry to stabilize its business.

Mr. Roeser called attention to the fact that oil fields have been brought in in recent years that exceeded any previous big fields in production, and that whereas in the earlier years of the industry big fields were discovered on an average of six or seven months apart, they have in recent years been discovered months apart. He referred to the opening of Spindletop in 1901, Glenn Pool in 1905, Cushing in 1912, and the North Central Texas Field in 1918, all of which had a serious bearing on crude oil markets, but all of which had passed their peak before the suceeding one came in. In the past seven years such fields as Yates, Hendricks, Borger, Pampa, Van, Longview, Kilgore, Joiner, Spindletop deep sand, Seminole, Oklahoma City, Santa Fe Springs deep sand, Long Beach deep sand, Kettleman Hills and others have been opened and developed keeping either the actual or potential supply of oil far above demand for it.

Mr. Roeser characterized the Yates Pool as a 500,000,000-bbl. field ultimately and the East Texas Field as being good for from 1,500,000,000 to 2,000,000,000 bbls. of oil if developed according to the best engineering usage, and made the claim that Texas has from wells already drilled, a 10-year supply of oil.

The speaker reviewed the long fight for curtailment in the different states that have had an overproduction and complimented the various state administrations that have come to the aid of the conservationists. He deplored the fact that a small percentage of producers had seriously handicapped the effort to make curtailment of production a general industrial policy.

The industry, said Mr. Roeser, has a good view of what is immediately before it in diminished markets for refined products, both at home and abroad, and is aware of the necessity of keeping its producing and manufacturing program down to requirements. It must rid itself of excessive crude and refined stocks. There is only one way to do all this and that is to produce less oil and manufacture less product. Mr. Roeser noted that there are 329,000 oil wells in the country, of which 300,000 average 2 bbls. or less per day. The other 29,000 wells are producing the bulk of the oil. To the big producing wells the industry must apply the only preventive of business ruin, which is curtailment in line with demand.

It was at this point Mr. Roeser made his plea to the refiners for complete co-operation with producers in the interest of the whole industry.

Economic Reports

John W. Frey of the Bureau of Domestic Commerce and Albert J. McIntosh of the Standard Oil Co. of New York presented the statistic surveys and economic forecasts of the refining situation as chairmen of the two committees, one of the Institute and the other the Federal Oil Conservation Board. Mr. Frey presented graphs showing the rise and fall of oil exports of various producing countries and called special attention to the inroads upon America's foreign markets made by Russia and Rumania in the past two years.

The Taxation of Gasoline was treated at length by Henry F. Long, commissioner of Corporations and Taxation, Commonwealth of Massachusetts.

PURCHASING COMPANY MOVES

The Sinclair Prairie Oil Marketing Co. moved from its offices in the Exchange National Bank Building to the Sinclair Building, Tulsa, and is now located on the third floor. The company purchases oil in Oklahoma, Kansas and Texas.

Effect of Drilling Mud on Production In California Fields

Sealing Off Sands Has Resulted In Loss of Millions of Barrels

By A. C. Rubel
Union Oil Co. of California*

The properties and uses of rotary mud have been quite thoroughly studied as they relate to drilling only, but little attention has been given to the effects of such muds on the subsequent production of oil.

It is this latter phase of the subject with which this paper is concerned.

A preliminary survey of the problem clearly indicates that, although the majority of operators and engineers are keenly alive to the detrimental effect of drilling mud on production, there is far from a unanimity of opinion as to just what those effects are and how they should be avoided. It was, therefore, believed desirable to devote the efforts of the committee, first, to the outline of the problem in all of its ramifications, so that a concerted attack can be made on its various features.

It is the consensus of opinion that "mudding" or sealing of oil sands is, and has been, responsible for the irretrievable loss of millions of barrels of oil in California operations. This is perhaps more important in California than elsewhere in the United States, due to the peculiar nature of the producing formations and the extreme depth of the producing sands.

California producing formations are, for the most part, alternating series of soft shales and fine to medium grained loosely consolidated sands, or unconsolidated sands, in great thicknesses. In Signal Hill, for example, there is an unbroken sequence in parts of the field of from 1,800 feet to 8,000 feet, and it is not uncommon to find 1,200 to 2,200 feet of formation open to production in a well. Other fields are of similar character. The producing depths of the more recent fields is also a factor of great importance, and it appears quite probable that depths at which production may be obtained may be definitely limited by the ability of operators to solve the problem of "mudding off" producing formations.

What Is "Mudding Off"?

The general conception of the mechanics of "mudding off" is briefly as follows:

In drilling into an oil sand, mud under a high hydrostatic head is brought into contact with oil sand of relatively high porosity with varying pressures and fluid content, and builds up on the wall of that sand by filter action a cake whose thickness, penetration, and tenacity are dependent on the differential pressure, sand texture, and mud composition. Experimental evidence indicates that the actual penetration of mud into a sand is comparatively slight; but that water, with which the mud is mixed, penetrates for considerable distances. The tenacity or durability of this mud filter cake is, no doubt, intensified by the mechanical action of the drill pipe, which trowels it into the formation. Few data are available from experimental work as to the relation between the pressure required to form the cake and the reverse pressure required to dislodge it or expel the drilling water from the formation; but it must be assumed, in the light of experience, that it must take considerably more pressure to dislodge the mud from the wall of the hole and expel the water from the sand than to put it there.

Shell's Conclusions

Under the direction of H. H. Anderson, the Shell Oil Co. undertook a study of this problem in 1922. Its conclusions are briefly summarized as follows:

"The density of the fluid has very little effect on the thickness of deposit of mud on the outside of the formation.

"The depth of penetration in 30-mesh sand was 8 to 12 times that in 150-mesh sand.

"The depth of penetration of the light gravity fluids is greater than those of the heavier gravity fluids.

"The total penetration of the admixing water was practically constant for all gravity fluids except the very lightest.

"The depth of penetration increases with approximately the square root of the pressure.

"The speed of the 'mudding off' process is practically instantaneous.

"The deposit, both inside and upon the surface of the hole wall, is quite permanent as long as the hydrostatic pressure on the fluid in the hole exceeds the rock pressure of the fluids—water, oil and gas being mudded off. The deposit, however, offers no resistance to being backed out of the formation as soon as the rock pressure exceeds the hydrostatic pressure in the hole. The deposit acts only as a sheath held in place by the hydrostatic pressure in the hole.

"Where the formation can be filled or mudded up as completely as possible by the original application of a mud laden fluid under pressure, the re-application of the same or equal pressure after three hours or longer will not effect any further penetration or taking of mud by the formation. However, if the pressure in the second application is greater than it was in the first or original application, then the final penetration is approximately the same as if the greater pressure had been applied in the first place.

"It is believed that the plastering action of the drilling bit compacts the mud deposit on the surface of the hole, inhibiting the formation from taking its full quota of mud at the equivalent mudding pressure, but forming a much better and stronger sheath than obtained in undisturbed mudding.

"It is believed that a mud wall or sheath built up with the rotary bit is far superior to any sheath which can be obtained by breaking down the bit-compacted sheath and attempting to rebuild same by undisturbed mudding or 'supplemental circulation.'

"It is believed that the so-called absorption of mud in a hole during 'supplemental circulation' is in reality an absorption of water by the formation and a deposit of additional mud on the inner wall of the hole. The water is probably transferred through the existing sheath by a process analogous to capillary or sponge action."

The efficiency of the mud-laden fluid is materially reduced by the sand which is picked up from the hole cuttings. Both the speed and depth of penetration are considerably decreased. To get best results, the fluid should be separated as freely as possible before it is re-introduced into the hole through the mud pumps.

The result of more recent work is furnished by H. H. Farnham, as follows:

"A filter press was constructed in which drilling mud was pumped at 1,000 pounds per square inch pressure against a filter medium of sand. The first few drops of filtrate which pass through the sand was muddy water, and of the total filtrate approximately 95 per cent was clear water. The constant pressure of 1,000 pounds was held on the drilling mud until no further filtration occurred. The time required for complete cessation of water flow ranged from 20 minutes to 60 minutes. The press was then opened, and the thickness of deposited cake was measured. All drilling muds used in the tests were prepared to a uniform viscosity of 10 centipoises, as determined on the Stormer instrument at 600 r.p.m.

FILTER CAKE THICKNESS REQUIRED TO STOP WATER FLOW AT 1,000 LBS. PER SQ. IN.

Clay—	Cake thickness (inches)
Specially prepared bentonite	1/8
Oklahoma mud	1
Coalinga mud	1 1/4

"These tests show that little or no mud leaves the bore hole, but that the mud solids are filtered out and are deposited on the walls of the hole. The water present in the original mud, however, is forced into the formation to distances and in quantities imposed by the previously mentioned limits.

"The thickness of filter cake set opposite each type of clay indicates the wall thickness required to stop all loss of water into the formation at 1,000 pounds per square inch differential pressure. A corresponding increase in thickness of cake is required to stop all water infiltration at differential pressures in excess of this. In many cases the depth of the well is such that a thickness of cake is required which is greater than the radius of the bore hole, and the infiltration of water is never completely stopped. The scraping and rotating action of the drill pipe also may dislodge some of the filter cake, and allow water to penetrate into the formation continuously during the drilling operation. It behooves the operator, therefore, to use a drilling mud which will deposit that type of wall which offers the greatest resistance to flow per unit of thickness. This is the drilling mud which contains the greatest percentage of gel-type colloids."

Intensifies Problem

Add to these conditions a string of perforated pipe of from 80 to 250-mesh, fitting the hole with a small clearance and acting as a reinforcing medium, and the sealing effect of the mud sheath and difficulty of removal are further intensified.

It is the elimination of this mud cake, either by the prevention of its formation or its subsequent removal by mechanical or chemical means, as well as the prevention of water infiltration into the sands, that is the subject of this study.

The effect of the partial water saturation of an oil or gas sand and its subsequent expulsion has received too little attention, although it is probably a matter of almost equal importance to that of mud. Van Mills did some extremely interesting work with the U. S. Bureau of Mines some years ago, which has apparently never been published. He demonstrated experimentally that the pressure required to displace oil in a sand with water was much less than to displace water in the same sand with oil. The differential pressure required varied inversely with sand porosity. A study of relative surface tensions and movements through capillary spaces should throw light on this subject.

In high pressure flush fields the problem is not of vital importance, although it becomes increasingly so with increased depth of drilling. Evidence in Kettleman Hills, one of the highest pressure fields in the country, indicates that in spite of its high rock pressure, producing wells continue to make mud and drilling water in decreasing amounts months after completion.

In semidepleted fields, however, where formation pressures have declined to small figures, the problem is most serious. There are numerous instances on record where in sands known to be capable of 50 to 250 bbls. per day production no oil can be commercially produced at present with rotary drilled holes, and where, unless other means are employed, large reserves of oil will be lost to the industry. There are hundreds of acres of such territory in California, particularly in the Maricopa-Midway, Elk Hills, and Coalinga areas.

Unless some other means than the present rotary system of drilling is developed, most of the oil under these conditions is lost forever.

Muds Can Be Chemically Treated

A very pertinent suggestion is offered by Albert J. Rainey, as follows:

"The method of treating drilling muds with chemicals permits the new application of an old principle of converting liquids into solids by the process of crystallization. Water, a very mobile liquid, is crystallized or converted into the solid state (ice) by the reduction of temperature, and in such condition it loses all of its mobility. In the chemical industry there are numerous examples of this change from the liquid to the solid state either by physical or chemical action. Although this process is used in many branches of the industrial world, it has only recently been applied to the technique of oil well drilling. Its principal use is in restoring or preventing lost circulation. When a chemically treated mud begins to enter a porous formation to the extent that circulation is lost, a different chemical substance may be added which will start the process of crystallization, thus changing a part of the liquid mud into solids. In areas where there has been an accumulation of the chemically treated mud, as in a cavity or a very porous stratum, this process of crystallization continues until it has built up a strong, rigid, impervious wall with large crystals, thus preventing further circulation losses at that point. This formation of crystals by chemical action is not rapid enough to cause the drill pipe to stick. Proper regulation of the chemicals delays the action several hours. When the hole is reentered to resume drilling, the treated mud can be drilled through without trouble; but it has become set enough to prevent further loss of circulation. When the lost circulation has been recovered, the wall of the hole soon becomes covered with a thin plastic coating containing chemicals that will solidify similar to any other portion of the hole. To use the term of the driller, it has been 'mudded up,' and is ready for the making of new hole.

"After drilling has been completed and the well ready for washing, another chemical substance is added which causes the crystals to dissolve, so that they may be washed out of the hole. The chemicals used in this process are not excessive in price, and have no injurious effect upon the casing or the cement."

*Before A.P.I. Production Division midyear meeting, Tulsa, June, 1932. For the California District Subcommittee on Drilling Practice; members: R. D. Copley (chairman), Standard Oil Co. of California, Los Angeles; Bruce Barkis, Rio Grande Oil Co., Los Angeles; C. J. Coberly, Kobe, Inc., Los Angeles; L. A. Cranson, Honolulu Consolidated Oil Co., San Francisco; F. W. Hertel, Associated Oil Co., Ventura; W. F. Huff, National Supply Co. of California, Los Angeles; W. M. Jones, Petroleum Equipment Co., Los Angeles; Edmund Jussem, Jr., Union Oil Co. of California, Los Angeles; H. N. Marsh, General Petroleum Corp. of California, Los Angeles; P. C. McConnell, Standard Oil Co. of California, Taft; M. N. Phillips, Continental Oil Co., Los Angeles; F. J. Shaver, Ventura; Ben K. Stroud, National Tube Co., Los Angeles; R. P. Tallant, Union Oil Co. of California, Santa Fe Springs; and D. K. Weaver, The Texas Company of California, Long Beach.

Rotary Mud Practice in Mid-Continent

Selection of Admixtures to Give Sealing Qualities and Penetration for Certain Types of Sands Essential

By C. P. Parsons
Halliburton Oil Well Cementing Co.*

Many operators in the Mid-Continent area originally came from the eastern fields where cable tools were used exclusively. The "digging" in Kansas and northern Oklahoma responded well to their methods, and many fields were successfully developed by cable tools exclusively. The great Bartlesville sand was developed with cable tools. On the other hand, when cable tool drilling was begun in southern Oklahoma, the formations mudded up, or sluffed, so badly when water was put into the hole for drilling purposes that casing had to be "carried" immediately behind the bit. Furthermore,

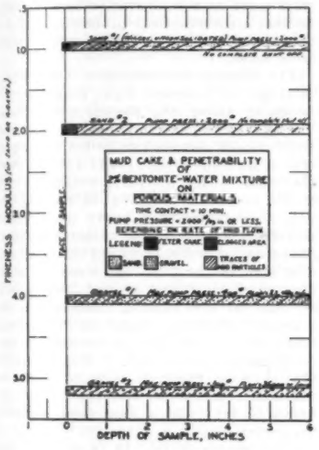


Figure 1

it was frequently necessary to set a string of casing after each water sand had been drilled through for the purpose of preventing the water from running down and sluffing the lower formations during drilling. In many instances it was necessary to carry a hole full of water; and, consequently, their "dry hole drilling" advantage was lost. These conditions indicated that southern Oklahoma offered the most fertile field for rotary tools in the Mid-Continent area

Before 1919 there were a few scattered attempts to use rotary methods in Oklahoma, the first successful attempt being the Hewitt Field in southern Oklahoma in 1919. Although some operators believed that the rotary method offered many advantages, others at first were not of the opinion that a single string of casing could be set which would accomplish successful water shutoffs. Formation shutoffs in that field were none too effective. Some operators discussed the advisability of obtaining court injunctions against the use of rotary tools; but the rotary method was tried and accepted after the operators had become convinced that a single string of casing could be successfully cemented and do the work of several strings. Later about 85 per cent of the drilling wells were being "dug" with rotary tools; and the Walters, Fox, Graham, Duncan, Cement, Chickasha and other fields in southern Oklahoma soon followed.

In former years fear was felt that rotary mud would have a sealing effect on the productive sands, and operators were reluctant to drill productive sands with rotary tools. Also, there was a state ruling in Oklahoma against completing wells by the rotary method; and, as a result, rotary tools were used only to drill the hole down to a point approaching the productive sand, where casing was run and cemented. The rotary tools were then removed, and the well was completed with cable tools. The confidence of operators and state authorities gradually increased, and for the last 10 years the majority of the wells in southern Oklahoma have been completed with rotary tools.

A 10,000-foot well was drilled by the rotary method in the Cement Field last year; yet only 10 years ago the field was being drilled with cable tools—3,800 to 4,000-foot wells being about the deepest when testing everything from the surface down.

There is no evidence at hand of a permanent sealing effect on production by rotary mud used in the drilling of any

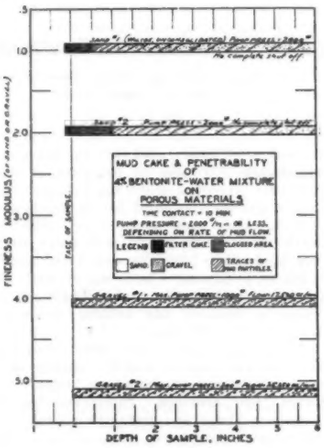


Figure 2

of these wells. Natural drilling mud was used in most cases.

About the most practical evidence that there was no material penetration of mud into the productive sands of southern Oklahoma is offered by the appearance of thousands of cores of oil and gas sands that had stood at the bottom of holes exposed to a rotary mud column for several hours while the bits were being pulled and core barrels run. When the cores were broken, there was no appreciable penetration of mud particles into the sands.

Development in Chickasha Interesting

Development of the Chickasha gas field in southern Oklahoma offers some interesting facts concerning the problem as a whole. This field is a dry gas area, with original reservoir pressures ranging from 500 to 1,200 pounds per square inch, and about 300 wells were drilled to various gas sands, ranging in depth from 1,200 to 3,100 feet. With few exceptions, the field was developed by the rotary method from 1,922 to 1929, during which time the pressure gradually decreased to 150 to 500 pounds per square inch due to withdrawal of gas. About 100 of these wells were completed with rotary tools in a single gas sand at about 1,200 feet, without screens of perforated liners; whereas subsequently, some wells in the field were bailed and killed a number of times before the liner was run. This repeated drilling, bailing and killing with rotary mud had no appreciable effect on the amount of gas produced. Although the sands and other formations were sufficiently consolidated to stand up under this bailing, they were soft enough to be drilled with fishtail bits. One operator, when changing over from drilling-n with cable tools to rotary tools, in an endeavor to keep the mud away from the sand, drilled into the sand in the first two wells "dry," i.e., the sands were drilled by the rotary method without any mud in the hole. It so happened that the pressure and other conditions in these two wells were such that there was no extreme hazard during drilling, but there was a hazard in coming out of the hole. The idea was discontinued as unsafe for general practice, and this operator then drilled all wells in with rotary tools, using a hole full of mud when drilling into the gas sands. He did not notice any ill effects from mud penetration.

Tonkawa Progressed With Rotary Tools

Tonkawa was the first field in northern Oklahoma in which rotary drilling was practiced. Some operators as early as 1922 wished to try rotary tools, but others brought the matter before the Corporation Commission. One faction felt that as there were three separate producing sands in the field, a single string of casing set with rotary tools would not protect all as well as the several strings set by cable tools. As soon as the operators and authorities felt that this could be done by properly cementing the casing, the use of rotary tools commenced. To meet the formation conditions, some

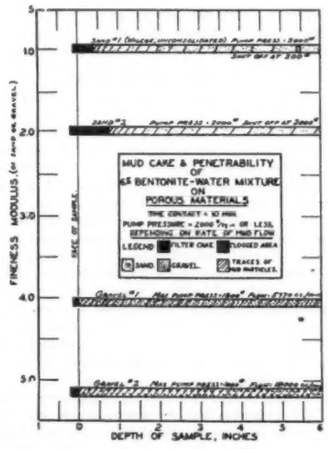


Figure 3

operators drilled three wells to each location, each well to a different sand. It was very important that the single production string in the deepest of these wells be in condition to protect the nearby wells in the shallower sands. The usual procedure in drilling these "triplet" wells was to drill by the rotary method down to within the vicinity of the first sand, and then to cement casing and drill in with cable tools. Approximately 50 to 70 feet away the second well was drilled in the same manner, except that rotary tools were used through the first sand and casing was set near the second sand. The third well, about the same distance away, was rotary drilled through the first and second sands, and casing was set near the third sand. Although these wells were close together, there is no evidence available as to any serious effect on the upper two sands caused by rotary mud in the wells drilled to the deepest sand.

Following the Tonkawa development from 1923 to 1928 the application of rotary tools spread quickly, and found widespread use in Garber, Cromwell, Wewoka and Seminole. During this time, in northern Oklahoma, rotary tools were used primarily for drilling in proven fields to a point near the producing formation. The wells were finished up with cable tools. Test wells were drilled exclusively by cable tools because of the feeling that rotary mud would seal off the productive formations.

It was not until the development of the Oklahoma City Field in 1929 and 1930 that the rotary method became generally used in northern Oklahoma, being employed exclusively for complete drilling of the wells. The wells are deep, and fluid-column pressures are considerable; yet the formation pressures are also high. The resulting differential pressures have produced no material sealing effect of rotary mud on the producing formations, as evidenced by the quick cleaning of the formations and the ease with which production was obtained.

In order to get some evidence of the sealing effect of the rotary mud on low-pressure sands in northern Oklahoma, consideration has been given to the effect of rotary mud on shallow sands that had been drilled through with rotary tools and cased off and which later, when the deeper oil sands had been depleted, were produced by shooting or perforating the casing. There is not sufficient evidence available to justify definite conclusions, but there are many cases of shallow sands having been successfully produced under such conditions. Whenever there was failure to produce from these shallower sands, there was usually evidence of some reason other than penetration of rotary mud.

Kansas Has Lost-Circulation Problem

Kansas offers problems in loss of circulation in rotary mud; but as there is comparatively little rotary equipment there, and as the rotary-drilled wells are

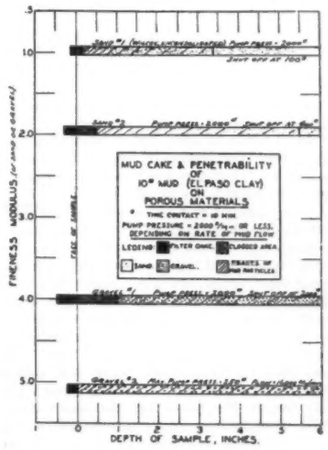


Figure 4

completed with cable tools, there is no conclusive evidence available as to sealing effect. It is felt that there has been no substantial evidence of a production problem due to a sealing-off effect of rotary mud penetrating producing sands in this area, except possibly in crevices and fissures, and that producing sands in this area have been sufficiently "tight" to prevent any material penetration of rotary mud.

There have been scattered cases in the Mid-Continent area where it has appeared that rotary mud had penetrated a formation from one well to another. Whether this has actually been due to crevices, fissures or contacts between crooked holes

*Sponsored by the Mid-Continent District Subcommittee on Drilling Practice. Members: C. P. Parsons (chairman); K. A. Covell, Indian Territory Illuminating Oil Co., Bartlesville, Okla.; J. T. Hayward, Barnsdall Oil Co., Tulsa; D. L. Trax, Gypsy Oil Co., Tulsa, and W. K. Whiteford, Barnsdall Oil Co., Tulsa. Before A.P.I. midyear meeting of Production Division, Tulsa, June 1-3.

is not definitely known. Also there have been cases where, in attempting to break the circulation around casing, some unknown formations—not necessarily productive—have taken rotary mud when high pump pressures were applied, but which would not take it under normal circulation pressures.

Mud Penetration

Considering these exceptional and often unexplainable cases, and the fact that rotary mud readily penetrates certain formations containing crevices, fissures, gravel and "chat"—causing considerable drilling difficulty, it is felt that the subject of mud penetration is important and worthy of study. Also, it is important to know under what conditions sands are, or are not, sufficiently "tight" to resist penetration of different types of mud. Therefore, the following theoretical comments are offered:

The amount of penetration of rotary mud into a sand and its sealing effect on production, if any, depend largely upon the following factors:

1. Rotary mud
   - A. Pressure (Weight of fluid column plus pump pressure).
   - B. Size, shape, and concentration of the solid particles.
   - C. Viscosity.
   - D. Colloidity and gelling action.
2. Sand
   - A. Size, shape, and interconnection of voids.
   - B. Shale particles and bonding material in the sand that will hydrolyze and swell upon contact with water from the mud.
   - C. Structural resistance offered by the reservoir to inward flow of incompressible fluids as a mass within the reservoir.
   - D. Consolidation.
3. Production
   - A. Compressibility.
   - B. Reservoir pressure.
   - C. Viscosity.
   - D. Saturation of sand.
   - E. Resistance to inward flow of incompressible production, as a mass within the reservoir, caused by salt water down the structure.

Rotary Mud Pressure—The heavier the mud, the greater will be the effective pressure acting to force the mud particles into the sand; also, the higher the mud pressure, the more it will act to compress or cause the production to flow inwardly within the sand.

Size, Shape, and Concentration of Solid Particles—Natural drilling muds usually contain particles sufficiently large that they will build up a filter cake on the face of a sand, provided water is forced out of the mud into the sand. The filter cake becomes sufficiently impervious to prevent further loss of water from the mud. However, the smaller the mud particles the more likely they will follow the water into the voids of a sand; and the larger the particles, the more likely will free water continue to leave the mud, passing out through the voids between the mud particles. The shape of the particles is a factor; as sharp and angular shapes wedge closer together than do rounded. Concentration of the particles is a factor; because the higher the concentration, the lower the amount of free water.

Viscosity—The higher the viscosity, the slower the mud will penetrate into a sand.

Colloidity and Gelling Action—Colloidal properties cause the mud to set up into a gel when at rest. Agitation not only prevents gelling; but after a mud has gelled, it causes a return to the fluid state. The gelling action has much value in overcoming lost-circulation problems.

Sand

Size, Shape, and Interconnection of Voids—These not only affect capillary action and penetration of water from the mud, but also penetration of the mud particles into the sand.

Shale Particles and Bonding Material—Sands may contain colloidal matter which has not been affected by the oil or gas within the formation, but which will hydrolize and "swell" upon contact with fresh water that filtered out of the mud and penetrated the sand. This "swelling" will act to reduce the size of the voids.

Structural Resistance—In lenticular or other closed-type structures structural resistance will not allow production to flow inwardly as a mass within the reservoir. Outward flow of production from such a structure into a well is usually due to expansion of gas as a result of differential pressure when a well is open.

Consolidation of the Sand—The sealing effect of rotary mud is influenced by the harder or more consolidated sand—provided the sand pores are sufficiently large to allow penetration of mud particles. The resistance to the production breaking down the clogged face of a well consolidated sand will be greater than a softer or less consolidated sand.

Production

Compressibility—The more compressible the production, the less resistance it will offer to the penetration of the mud or water from the mud.

Reservoir Pressure—The higher the pressure, the greater will be the density and viscosity of production and the less will be the compressibility, with both affecting the penetration of the drilling fluid into the sands.

Viscosity—The higher the viscosity, the greater will be the resistance of production to inward movement through voids in the sand.

Saturation—Partially depleted sands may leave gassy areas in the sand, offering less resistance to penetration of the mud than do the more saturated areas.

Resistance to Inward Flow—The mass within the reservoir—caused by salt water down the structure—is a factor, because the pressure of the mud may be sufficiently great to overcome capillary action on the oil in the sand but not to overcome capillary action on water in contact with the oil down the structure.

Experience of Operators

The following typical cases illustrate the above factors:

One operator reports that in the Seminole area 37 wells, which were drilled to the top of the Wilcox sand at 4,000 to 4,200 feet, using 10 to 12-pound mud, were later plugged back to the Cromwell sand at 3,400 to 3,600 feet, and to Hunton lime formations at 3,800 to 4,000 feet. Each case showed that the upper formations were open to the extent that they produced either water, oil or gas, and indicated that they were not permanently sealed by the mud fluid even though a 3,400 to 4,000-foot hydrostatic head of mud was imposed for a considerable time.

Another operator in the Oklahoma City Field reports that recently, while killing a well in preparation for cleaning out with rotary tools in order to plug back, the well was killed with mud after considerable trouble. The well was to be plugged back in an effort to shut off salt water believed to be coming from the Stamper lime. After five days of killing and cleaning out with rotary tools, the mud-fluid level started down, resulting in a loss of mud to the formation. The following day another well, located 660 feet west, produced; and after six hours the well showed a "slick" mud with the regular water production coming from the well. After flowing for awhile, the well was shut in awaiting the completion of clean-out work at the other well. Vertical tests on these wells have been carried down to 4,500 feet and the deviation from vertical at that depth was about 100 feet on the first well and about 122 feet on the second well. The wells were about 6,000 feet deep.

Another operator reports that practically all of his experience has been gained

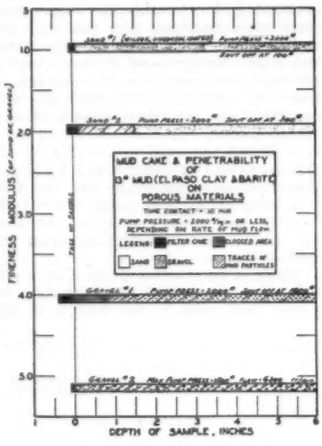


Figure 5

in soft sand fields, and that he has never encountered trouble in bringing in low-pressure oil—even when the drilling fluid has stood on the sand for a number of weeks. Also, some wells were drilled to 3,000 feet—with heavy and thick drilling mud—into partially exhausted sands, with rock pressures between 50 and 100 pounds per square inch. These wells came in without any trouble when the mud was bailed down.

In Kansas there are many instances of lost circulation due to rotary mud penetrating coarse gravel or "chat," fissures, and crevices. In attempting to overcome these lost-circulation problems, operators have tried various materials, such as cement, lime, bentonite, and clay, either alone or mixed with fillers such as wheat grains, cottonseed hulls, ensilage, etc. In such attempts the latest trend is to use a material which will gel or stiffen when agitation ceases. Such materials are used either alone or with cement or fillers.

Sealing Effects of Rotary Mud

One operator reports that a test was made several years ago to determine penetrability of mud in a sandstone similar to the Wilcox sand. A hole 1 inch in diameter was drilled in the center of a block of sandstone 1 foot square. Small pipe was cemented in the hole, and mud fluid introduced through the pipe to the inside face of the sandstone at 200 pounds pressure. After a short period clear water oozed from the other side of the sandstone. Pressure was gradually reduced, and the mud allowed to dry. The stone was then split at the hole, and a microscopic test made. It was found that water had filtered into the sand from the mud, leaving a thin and easily removed film of mud on the sand face.

Laboratory Data

The accompanying laboratory data are offered to illustrate the accumulation of mud filter cakes on the face of fine and coarse sands and gravels, the clogging of mud particles within the voids, and the total penetration of the mud particles when using different types of mud.

It is obvious that no one type of test can be made to represent all the actual conditions in oil and gas wells, and it would take a long series of tests to cover the 13 variable factors connected with the mud, sand, and production.

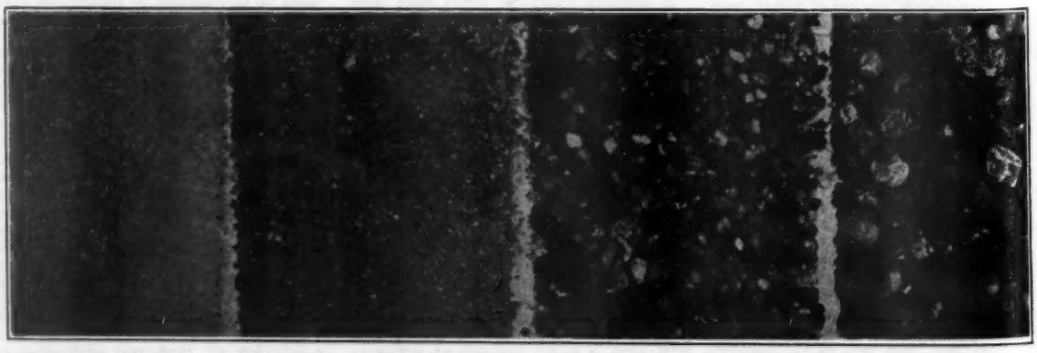
It is possible, however, to make a short series of tests that will illustrate the penetration of certain muds of known chemical and physical composition into samples of porous materials grading from fine sand to medium-coarse gravel. Such tests serve as a comparative basis in connection with practical problems, and for this purpose the following mud fluids were used:

(1) High-grade bentonite and water mixtures to represent light weight muds, weighing about 8½ pounds per gallon; (2) El Paso clay and water mixture, weighing 10 pounds per gallon, to represent a medium-weight mud; (3) El Paso clay and water mixture weighted with barite particles, weighing 13 pounds per gallon, to represent a heavy mud. These materials were selected, rather than natural drilling muds, because they are actually used in the field, and their chemical and physical properties are known better than natural drilling muds, which are a conglomeration of many materials from many formations. As to the porous materials used in the test, it was desirable that a wide range in size of voids be available; and four materials were selected to represent a fine sand, a medium-coarse sand, a fine gravel, and a medium-coarse gravel. In as much as the coarser materials were only to be had in an unconsolidated form, and since the size of voids was to be indicated by means of "fineness modulus," which is applicable only to unconsolidated materials, it was decided to use the sands in unconsolidated state.

To represent a fine sand, Wilcox sand was obtained in block form from the outcrop in the Arbuckle Mountains, but broken down for the tests. The medium-coarse sand and the different size gravels were of a type used for construction and filtration purposes. The Wilcox sand in consolidated form is, of course, less penetrable than the unconsolidated form as used in this test. Therefore, if in interpreting later tests it is apparent that there would be no harmful penetration affecting a particular form of production in an unconsolidated Wilcox sand, there would be less chance of harmful penetration in this sand in consolidated form.

Method of Tests

In carrying out the tests with various fluids and various unconsolidated mate-



Sand No. 1 Sand No. 2 Gravel No. 1 Gravel No. 2

Figure 6—Porous materials used in the tests.

rials, the latter were packed into 2"x6" nipples and installed in the apparatus. This was used both for mixing the mud and for making the penetration tests. The mud was forced into contact with the sand or gravel for a period of 10 minutes while a pump pressure of 2,000 pounds per square inch was being built up. In cases where the mud fluid penetrated and was pumped through a sample at a rate which prevented reaching a pressure of 2,000 pounds per square inch, the maximum pressure reached was recorded. After each test the pores of the material were examined to determine thickness of the filter cake, total depth of clogged pores in the sand or gravel, and total depth of penetration by scattered mud particles. The mud filter cake and clogged area were considered as the primary factors that would possibly affect production. The penetration of water due to filtration, and the penetration of scattered mud particles, were considered as secondary factors.

In operating the apparatus, the fluid was first mixed and was then pumped into the porous material. When mixing, the gate was closed and the mud-making materials introduced into the swage. These materials passed through the swage into the suction, where they were picked up by the pump and forced through the discharge connection back into the swage. Thus the mud materials were recycled until thoroughly mixed. In the meantime, however, a nipple containing a sample of porous material, was screwed in place, and the discharge of the pump was then diverted through the valve to force the mud mixture into the sand or gravel sample.

In Figures 1 to 5 porous condition of the sand or gravel was graded according to "fineness modulus," the most suitable and standard basis available. It was selected because it indicated the size of the particles of sand or gravel, which is an indication of the size of the voids. The fact that the porous materials were unconsolidated is an indication that the voids were interconnected.

Porosity

Porosity, or percentage-of-voids determinations, were not suitable for grading in these tests because some materials with high porosity may be low in penetrability and permeability, and other materials with low porosity may be high. For instance, all of the porous materials used in the present series of tests were unconsolidated; and, although they differed widely in the size of the sand or gravel particles, the porosity was very nearly the same, and yet the penetrability and permeability varied widely. It appears that permeability, or rate of flow of a fluid through a porous material would be the best form of grading for this purpose; but due to lack of a standard procedure for obtaining permeability readings, it was not used at this time.

Figure 1 shows that fluid consisting of 98 per cent of water and 2 per cent of high-grade bentonite built up a thin filter cake on both samples of sand, but not on samples of gravel. This indicated that the fluid was very thin and the bentonite particles very fine. The same is true of the clogged area. There were traces of bentonite particles all the way through the 6-inch sample of the sand and water. During the 10-minute contact, the pump pressure built up to 2,000 pounds on sand No. 1 without getting a complete shutoff. The same was true with sand No. 2, although the clogged area was considerably greater than in sand No. 1. There was no clogged area nor closely packed bentonite particles filling up the pores in the gravels. Both gravel samples, however, were filled with the bentonite water mixture, which pumped freely through the gravel. Figure 2, for which a fluid containing 96 per cent water and 4 per cent high-grade bentonite was used, shows that similar results were obtained as in Figure 3 with the exception that the filter cake was thicker in the sands and the clogged area deeper.

Figure 3, for which a fluid containing 94 per cent water and 6 per cent high-grade bentonite were used, shows that the results were similar to Figure 2 except that a penetration shutoff was obtained in sand No. 1 at 200 pounds pump pressure, and in sand No. 2 at 2,000 pounds; also there was a mud filter cake built up on the face of both gravels.

Figure 4, for which a 10-pound mud consisting of El Paso clay and water was used, shows that there was more filter cake on the face of the porous materials than with the 6 per cent bentonite fluid. The clogged area was smaller in the sands; and there was a clogged area in the fine gravel not found with any of the bentonite fluids. There was less penetration of clay particles in the sands than with the 6 per cent bentonite. A penetration shutoff was obtained sooner in the sands and in the fine gravel. There was a difference, however, in the maximud pump pressure and flow through the medium gravel. The El Paso clay flowed through the medium gravel at approximately the same rate of flow as the 6 per cent bentonite, but with a lower pump pressure.

Figure 5 in which a fluid was used weighing 13 pounds per gallon and consisting of El Paso clay and barite mixed with water, shows that an immediate shutoff was obtained in sand No. 1 with a very small filter cake and clogged area, and that there was no further penetration of mud particles beyond the clogged area, which was one-sixteenth inch deep. The penetration shutoff was obtained at 100 pounds pump pressure. In sand No. 2 the shutoff was obtained at 300 pounds, with a slightly thicker filter cake and clogged area and about 1⅜-inch penetration of scattered particles. In the fine gravel there was slightly less filter cake and clogged area, but a shutoff was obtained just a little sooner. In the medium gravel the filter cake was thinner than in the test with El Paso clay alone (Figure 4), but a much higher maximum pressure was obtained.

In all the tests the mud filter cake was a soft plastic mass which could easily be removed by low-pressure production in a well, and the clogged area could easily be removed by low-pressure production in an unconsolidated sand.

As to consolidated sands, it is reasonable to expect that if the same materials used in the test were consolidated, they would be tighter, due to the presence of bonding material holding the particles together, and that, therefore, they would be less penetrable and permeable. It would be reasonable to expect less filter cake, less clogged area, and lower maximum penetration. It is reasonable to believe that it would be practically as easy for the soft filter cake to be removed by low-pressure production from a consolidated sand as from un unconsolidated sand. On the other hand, it would be more difficult for low-pressure production to force out the same amount of clogged area in a consolidated sand than in an unconsolidated sand. With the latter, the sand itself would most likely yield; and this sluffing may cause some congestion behind a screen, in which case the importance of proper washing is emphasized.

Use of Mud in Southwestern District

Evidence Available Indicates Productive Formations in That Area Not Injured by Action of Rotary Mud Fluids

By Stanley Gill*

The study of the sealing effect of rotary muds upon producing formations is inseparably linked with the question of the comparative merits of cable tools and rotary tools for the completion of wells. Obviously, the most serious objection to the use of the rotary method for completions lies in the belief that the circulating mud fluid damages the productive formations, and that more productive wells can be obtained by cable tool completion. It is the opinion of the Southwestern District Drilling Practice Committee that the study of sealing effects of rotary mud fluids is best approached in its relation to its effect upon well completions, and that the most valuable information to be gained from the study of sealing effects lies in the comparison of rotary and cable tool methods of well completion.

The hydraulic rotary system of well drilling was, as everyone knows, initially developed to make possible drilling in certain territories where the loosely consolidated formations rendered the older cable tool drilling methods impracticable. This was particularly true of the Gulf Coast area of Texas and Louisiana and, to a somewhat lesser extent, of the California fields. The fact that rotary drilling was developed to meet conditions under which cable tools could not be used, resulted for many years in confining rotary drilling operations rather closely to the territories developed originally.

The fact that rotary drilling did not for many years encroach upon cable tool territory was not solely attributable to this territorial development. There were valid objections to its use; for rotary drilling was not in its early stages developed sufficiently to compete with cable tools outside the areas where subsurface conditions necessitated its use. The objections fell in three main classes:

A. Satisfactory drilling progress could not be made in hard formations.

B. The rotary tools gave less accurate information regarding the formations penetrated than did cable tools. This was in part due to the difficulty of obtaining formation samples, and in part to the sealing of the formations by the mud fluid.

C. It was believed that the sealing effect of the mud fluid not only made the location of the productive strata difficult, but also permanently damaged the oil sands.

Two Objections Removed

Of these three lines of objections, the first two were, in the early days of the development of rotary drilling, entirely valid. However, due to the development of modern rock bits and coring methods, they have been entirely overcome. It is probably justifiable to say that the rotary method at present possesses appreciable advantage over cable tools, both in speed of drilling and in the knowledge of the character of formations which can be obtained by proper coring. However, the third objection, relating to the sealing off of productive formations by mud fluid, has never been overcome; and it is still generally believed in many areas that oil-producing formations will be seriously damaged if they are drilled with rotary tools. This is the cause of the common practice of drilling to a point somewhat above the producing horizon by the rotary method, thereby taking advantage of its high speed and economy of casing; of setting casing at this point, and drilling into the sand with cable tools. This obvious expense and delay make it desirable to complete wells with rotary tools wherever possible. Since the practicability of rotary completion is limited by damage to productive formations by drilling mud fluids, study of the extent of such damage, and of means of abating such damage, may make possible a more extended use of rotary tools and consequent large savings to the industry.

Damage by Mud

Drilling mud fluid has been known to penetrate deeply into oil-bearing formations. However, it is the opinion of the committee that such penetration does not occur in continuous sand formations, provided a mud-laden fluid of suitable properties is employed. It is believed that all such damage falls in one of the following classes:

A. Cases in which the sand or gravel particles of the formation and, consequently, the voids between them are exceptionally large and may preclude the formation of an impervious wall of mud particles.

B. Mud fluid may penetrate deeply into fissured or fractured formations in which large passages may exist.

C. Damage by mud fluids will take place when fluids of improper character are employed, even though the oil sands are relatively fine and continuous.

The first two cases represent conditions under which rotary drilling using mud fluid cannot be satisfactorily employed for well completion. It is believed, however, that such instances are the exception, to usual conditions, and that in most areas completing with rotary tools will not damage productive formations, provided the properties of the mud fluid are controlled to insure against penetration. Such control is simple and certain, and an understanding of the necessary properties will prevent loss of production when wells are completed with rotary tools, and will make possible in a great many fields a considerable reduction of drilling expense.

This paper presents the field and laboratory data upon which members of the Southwestern District Subcommittee base their belief that damage to production sands by rotary drilling muds can be avoided in all but exceptional cases.

Nature of Sealing Action

The action of a properly proportioned mud fluid in sealing off porous formations may be very simply pictured. Since the weight of the mud fluid must always be such that its hydrostatic pressure is greater than the pressure existing within the formations, there is a tendency for the mud fluid to pass into the porous formation. This tendency is measured by the differential pressure just mentioned. The result of this action is to filter out the solid particles of the mud fluid against the face of the porous formation and so to form a wall of mud material upon the face of the bore hole. When a mud fluid of proper characteristics is employed, the wall becomes entirely impervious, and prevents the fluid from penetrating the porous formation. All tests and experience have shown that the mud wall can be broken down very easily when the pressure is reversed; i.e., if the fluid in the hole is lightened, or if its level is lowered to a point where the pressure within the well is less than the pressure in the formation, the deposit leaves the wall. Laboratory tests have indicated that only a few pounds of pressure are required to break down the filter cake. Obviously, therefore, a clay wall formed by deposition from a proper drilling mud fluid cannot of itself damage an oil-bearing formation, since the wall is fractured by the formation pressure as soon as the column is removed from the well. It may be accepted as a fact that damage by clogging or sealing of productive formations will be effected only when mud fluid itself, or water filtered from the mud fluid, penetrates the sand.

The damage to productive formations

*Before A.P.I. Production Division, mid-year meeting, June, 1932. For the Southwestern District Subcommittee on Drilling Practice; members: C. W. Alcorn (chairman), Shell Petroleum Corp., Dallas, Tex.; G. B. Corless, Humble Oil & Refining Co., Houston, Tex.; C. W. DeLancy, Humble Oil & Refining Co., Houston, Tex.; Stanley Gill; H. B. Hurley, Continental Oil Co., Big Spring, Tex.; Blaine Johnston, Simms Oil Co., Dallas, Tex.; L. K. Laney, The Texas Company, Fort Worth, Tex.; Melbert Schwarz, Rio Bravo Oil Co., Houston, Tex.; W. C. Thomas, Magnolia Petroleum Co., Lake Charles, La.; A. W. Thompson, Dallas, Tex.; J. Van der Henst, Gulf Production Co., Houston, Tex.; and A. H. Weyland, Arkansas Natural Gas Co., Shreveport, La.

by penetration of mud fluids may manifest itself by causing great difficulty in bringing a well in. This effect may not be permanent, and may be overcome after the flow of the well has cleaned the mud from the sand. On the other hand, permanent damage to the formation may be experienced, and both initial and ultimate production of the well may be seriously reduced. Not only would such penetration affect the main producing horizons of a well, but it would also damage upper productive horizons passed through in drilling to deep production or cased off while producing from the greater depth. Such damage to shallow oil-bearing formations may make it impossible to plug back and obtain production from them after the deep pay has been exhausted.

Field Data Upon Sealing of Formations

Unfortunately, there is little field information from which to determine the extent of the damage to oil-bearing formations caused by drilling mud fluids. Direct comparisons between rotary and cable tool completions, where both methods have been used at the same time in the same field, make possible a conclusion as to whether or not the rotary drilling mud has damaged the production of the wells. Cases where such direct comparisons can be made are, however, somewhat rare.

Rotary tools have been used in the fields of the Texas and Louisiana Gulf Coast since the first production was obtained. A few wells were drilled in at Spindletop with cable tools in 1901 and 1902, during the first year of production in this field. These wells do not, however, afford any basis for comparison, since they were completed during the flush period of the field, when most of the wells were brought in for from 10,000 to 20,000 bbls. per day, regardless of the method of completion. In a sense, however, all production from the Gulf Coast area tends to indicate that the sands are not appreciably damaged by the Gulf Coastal drilling mud fluids.

A group of wells completed during 1924, 1925 and 1926 in the old shallow field at Spindletop by the Gulf Production Co. will serve to illustrate this point. The area in which these wells were completed had been intensively developed since 1901, the sharply delimited productive area of some 265 acres having been drilled to a density of more than six wells per acre. From this area there had been produced prior to 1924 a total of 47,999,054 bbls. of oil, or an average of 190,000 bbls. per acre. During the three years 1924, 1925 and 1926, the Gulf Production Co. completed 20 or 30 more wells, ranging in depth from 800 to 1,000 feet, and obtained from them a settled production of nearly 1,000 bbls. of oil per day. Pressure conditions were highly favorable for penetration of the sands by mud fluid, since the formation pressures were extremely low. For the same reason, if penetration had occurred, the wells would never have produced, since the formation pressure in the previously drained area would be inadequate to force the mud from the sand. It is justifiable to conclude that the drilling mud fluid did not damage the productive formation. A possible reason for the fact that the sand in these wells was not damaged by the drilling mud is that Frank Patrick, field superintendent for the Gulf Production Co., who had charge of the drilling on these wells, made a practice of thickening the mud fluid before drilling into the oil-bearing formations.

Many similar instances of rotary completions in the Gulf Coast might be cited. It is common practice to use mud fluids to work over wells in which the strainer has failed. Such workovers are frequently, if not usually, made in wells from which much production has been secured, and in which formation pressures are relatively low. Although many workovers are failures, a sufficiently high proportion result in satisfactory production to make it certain that mud penetration does not cause any appreciable damage to the formations; in fact, such failures as do occur are believed to be primarily due to improper washing of the face of the sand and an incomplete removal of the mud walls caused by the filtering action previously mentioned. It is also common practice in the Gulf Coast to plug back after deeper production has been exhausted, and to perforate casing and set strainer casing opposite shallower formations which were passed up in the original drilling. This procedure has been reasonably successful in the Gulf Coast fields, and there is no reason to feel that the upper formations have been damaged, even though they have been in contact with the mud fluid for long periods of time.

A great mass of more or less indirect evidence of this type leads to the belief that productive formations of the Gulf Coast fields have not been damaged by rotary mud. This is in part due to the fact that the mud fluids of the Gulf Coast territory are of a highly colloidal character, and possess naturally most of the properties which are necessary for the prevention of penetration.

Although both rotary and cable tools have been employed in Central Texas and North Texas, there are few cases in which comparable completions make it possible to determine whether the productive formations were damaged by the use of mud in the rotary completions. Alcorn makes the following statement with reference to a group of wells which were drilled in Archer County by the Shell Petroleum Corp.:

"Up in Archer County we drilled 17 wells on our Abercrombie 'A' lease, in 1926 and 1927. These wells were approximately 1,350 feet in depth; and some of them, when originally drilled in, would flow small quantities of oil, not exceeding 200 bbls. Many of these wells had to be put on the pump immediately. On account of this extreme low pressure we tried drilling the wells in dry without any mud or water in the hole; we tried drilling in with clear water, and with mud, using rotary. It was definitely proved that the wells cleaned quicker, and came on normal production quicker, when mud was used to drill in with; therefore, mud was used to drill in practically all of the wells. We had a spudder in the district that we used for cleaning out, and at one stage of this development we considered that we could save a little time on a line fight by having the rotary rig moved to another location as soon as casing was set on top of the sand and drill the wells in with this spudder; and we so drilled 2 of these 17 wells. No difference whatever was noted in the ability of these wells so drilled with the spudder to produce as against the wells drilled in with the rotary; in fact, after deciding to drill with the spudder, we paid particular attention to this phase with the view that if it were proved better completions could be obtained by drilling in with a spudder, we would drill all of the wells that way."

This is a perfectly definite case in which the productive formation was thoroughly tested, both with and without the use of drilling mud fluid, and in which the mud fluid did not damage the productive formation in the least.

A. W. Thompson, as a result of his wide experience in northern Texas and southern Oklahoma, is of the opinion that the productive sands in this area are not damaged by the use of proper drilling mud fluids.

In the East Texas Field all of the completions have been made by the use of rotary tools. In most cases, the natural mud produced in drilling is used in drilling into the productive sands, although some operators follow the practice of drilling in with oil. Due to the conditions under which the field has been produced, there is no means of drawing final conclusions as to the relative merits of these two methods of completion. In northern Louisiana and Arkansas, rotary completion has been general practice, although cable tools have also been employed to some extent. A. H. Weyland, of the Arkansas Fuel Co., writes that after consulting the various operators in his district, he was unable to secure any comparative data which indicated damage to the sands by rotary mud.

In the West Texas fields, due to the fact that much of the production is obtained from fissured or coarsely granular limestone formations, rotary completions have not been generally employed. Some operators have, however, used the rotary method for the completion of a large number of wells; and the wells so completed appear to be, in general, at least as productive as those completed with cable tools.

It is generally believed by the operators in the Panhandle that rotary drilling cannot be successfully used for the completion of wells in this area. Jack Davis, of the Humble Oil & Refining Co., states that one of the principal objections to completing wells with rotary tools in the Panhandle seems to be that it is impossible to keep mud from sealing off the granite wash formation. In all cases where Panhandle wells were drilled in with rotary tools, oil had been used as a circulating medium. Davis lists 17 wells which were completed with rotary tools, together with offsets which were drilled in with cable tools. He states:

"In checking over actual production figures for a period of two years, I find that wells drilled in with cable tools have produced a larger volume of oil than wells drilled in with rotary. In reaching this conclusion I have taken wells that were completed at about the same time and which had approximately the same initial production upon completion."

Davis attributes the mudding off of the production to the fact that the granite wash carries large amounts of red rock and red shale. He believes that the shale and red rock are forced back into the formation by the oil used as a circulating fluid, and that they cause a considerable reduction in productivity. Since there is no record of completion of wells in this formation with rotary drilling mud, it cannot be said that the formation would be damaged if a proper mud were used for drilling in; in fact, experience in other territories supports a belief that a mud of proper sealing characteristics could be used for completion of wells in the granite wash without damage to the formation. Mud fluid would be less harmful than oil, if Davis' theory of the cause of the sealing is correct.

Formations Not Injured

Practically all of the evidence available in the southwestern district supports the belief that productive formations in this area have not been injured by the action of rotary mud fluids. While it is doubtless true that productivity of many wells in the Gulf Coast area has been diminished by the action of mud, this is not due to penetration of the sand by mud fluid, or to any other actual sealing effect of the mud on the formation. It is rather attributable to the difficulty of washing the mud sheath from the face of the sand and to clogging of the very fine mesh strainer by the solid material of the sheath. In other parts of the southwestern district there have been cases in which mud has penetrated the producing formations, and has even passed to adjacent wells. In all of these cases on which complete data are available, the penetration has been found attributable to fissures or to large interstitial passages in the formation. The general belief that rotary drilling cannot be used satisfactorily in the granite wash formation of the Texas Panhandle is not supported by any actual field data, since mud fluid has not been used in completing the few oil wells which have been drilled there with rotary tools. It is probable that a suitable drilling mud could be used in the granite wash without damage to the formation.

NEW DOHERTY BUILDING IN NEW YORK

East Texas Completions Pass 6,000

One Hundred Forty New Locations During Week and 155 Completions. Wildcat Tests Planned in Bowie, Cass and Fannin Counties

By L. E. Bredberg

DALLAS, Tex., June 6.—The total number of completed wells in East Texas has reached the 6,000 mark, 20 months after C. M. Joiner brought in the Rusk County, East Texas, discovery well, making an average of 300 completions per month since the inception of the greatest field in the country. This average would be even greater if three weeks were omitted, as during the latter part of August and first week in September, 1931, production was shut in, curtailing drilling activities.

Saturday morning 5,766 wells reported production showing an output of 315,401 bbls. for the past 24 hours, an average of 54.7 bbls. per well, or 0.7 of a barrel above the present daily per well allowable, which went into effect June 1, and which will hold until June 16 when another curtailment order is expected to be issued.

There were 155 wells completed in the field this week, 61 of them in north Gregg, 32 in south Rusk and 29 in south Gregg the three most active areas. There were 140 more locations staked. The field will probably average at least 120 completions per week for the next two months which will bring the total number of completed wells near 7,000.

Drilling Small Leases

Some independents are drilling as many wells as possible on the smallest of leases, working a hardship on offset lease owners, and also forcing a hardship on themselves eventually, as such additions add to the total number of producers and force further curtailment, cutting down the daily revenue from the wells they are already producing.

Drilling more wells on small tracts, cutting the acreage per well percentage to one well to every four or five acres, is frowned upon by the pipe line companies, as these companies have reached the saturation point in regard to connections, and do not care to tie into any more wells on such small leases. Drilling of more wells on these small tracts is sure to bring connection troubles to the owners, and will cause an increase in the number of unconnected wells in the district, which may be expected to affect the market which has been holding steady, although there have been quite a number of unconnected leases, and well owners in some cases have been selling their oil below the present market price of 98 cents per barrel. However, the East Texas pipe line committee has endeavored to hook up all leases on which titles are clear and on which there is not likely to be any future litigation, and has tried to prevent distress oil from being thrown on the market, but there is a limit to which the purchasers can go, and the small lease owners may force an ultimatum.

With the well allowable cut to 54 bbls. on June 1, the pipe line committee met in Dallas the following day and discussed the connecting to the majority of unconnected leases, many of the purchasers consenting to connect to several of the leases, leading to the belief that but few leases would be left without connections. The purchasers, however, are reluctant to lay any more lines to new leases, and the lease owners may help themselves by furnishing pipe for such outlets as they need, the pipe line or purchasing companies promising to lay the pipe for the well owners.

The Marr Drilling Co.'s No. 1 Tom Lacy in the J. H. Sparks Survey, extreme southwestern corner of the Joiner area, southern Rusk County, which encountered salt water, shutting down at 3,705 feet with only a small showing of oil and gas, not enough to merit running casing and making further test as to its possibilities, will probably be abandoned, thereby marking the southwestern limits of the field. It is approximately 1 mile southwest of the nearest gas producer, Wemack Oil Co.'s well in the northeast corner of the same survey. Gas production may be extended straight south or to the southeast from the Wemack producer, but as this company does not have an outlet for its gas, and gas from the several producers in this area is being sold only for drilling purposes, there is no incentive to drill other tests, and acreage to the south and southeast may remain untested for some time, at least until there is a market for the gas.

The field is now defined in all directions with the exception of the southeast, and only gas can be expected in future tests drilled in that direction from Wemack Oil Co.'s well.

Important Test

Sun Oil Co.'s No. 1 Alfred Lee is an important test drilling at the eastern end of the company's lease and on the east side of the Peter Tipps Survey, Rusk County, due to the fact that it is approximately midway between The Texas Company's No. 1 Henry, an oil producer in the Roane Survey to the north, and the Stanolind Oil & Gas Co.'s No. 1 Ras Lacy, a gasser on the south. It will be interesting to note whether the test will be an oil or gas producer, and it may define the line of demarkation between the oil producing and gas producing area.

The British-American Oil Producing Co.'s No. 1 Stone in the M. J. Prue Survey, in the heart of the Joiner area, Rusk County, which showed salt water last week, has been plugged back successfully shutting off the water. Total subsea depth was 3,298 feet or 22 feet higher than the known water level in the field, giving conclusive proof that the salt water danger is imminent in the field, and may show up at any time or possibly in any part of the pool if the wells are a little low structurally, are drilled too deep, or the immediate area is drained heavily of oil and gas. This well places a different appearance on the field, especially in this area which is the oldest and one of the heaviest produced areas in the district. Offset wells were not affected by the salt water showing in this well.

Cherokee Wildcat

Mustang Oil Co.'s No. 1 Decker and Whiteman in the F. W. Fulgham Survey, near Maydelle in Cherokee County, an interesting wildcat for the southwestern part of the county, showed almost a hole full of water when shut down at 5,202 feet, and will probably be plugged. It topped the sand at 5,183 feet, and Austin chalk at 4,932 feet, was checking higher structurally than the nearest test, Stone's No. 1 Becker to the southeast, but is apparently a failure unless it is drilled to the Trinity.

Only around 15,000,000 feet of gas per day is being taken from the gas wells in the southern end of the Joiner area, Rusk County, Sinclair Prairie Oil Co. piping about 9,000,000 feet from its well, the Stanolind Oil & Gas Co. using and selling about 4,000,000 feet from its well and 2,000,000 feet per day being taken from the Peyton Brothers' gasser. Total potential of these three wells is in the neighborhood of 130,000,000 feet per day.

Lease Transactions

The Shell Petroleum Corp., which has been farming out edge leases during the past few months, subleased its 120-acre tract on the M. T. Cole farm in the R. T. Johnson Survey, west Gregg County, to Deaner and others, for a five-sixteenths overriding royalty.

The Kewanee Oil & Gas Co. has purchased the Texas Pacific Coal & Oil Co.'s one-eighth royalty under its 187-acre fee lands in the B. W. Hampton Survey, western Gregg County, which gives the Kewanee company full royalty and lease ownership to the acreage, the company having purchased the lease on it several months ago.

Shell Petroleum Corp. sold its 69-acre A. Holt tract in the D. Clark Survey for a one-quarter overriding royalty, Shell keeping the one producing well and 10 acres around it. The Spansco company is starting a well on the lease. The tract is on the east edge in the Kilgore area, Gregg County.

The Atlantic Oil Producing Co., which has been purchasing proven and producing acreage in the field, purchased the 96 acres in the Mills-Bennett Production Co.'s Brightwell tract in the R. E. Winn and R. W. Smith Surveys in the Kilgore area, Rusk County. There are 11 producing wells on the tract, which were included in the sale.

The Houston Oil Co. leased its 6-inch line and one 55,000-bbl. steel tank to R. W. Porter and Paxton Gray, giving a one-year lease on the properties which are in the Kilgore area, and the line is being connected to the Tyler Pipe Line Co.'s line which transports crude from the Kilgore area to the Taylor Refining Co.'s refinery at Tyler, Tex. The 6-inch line connects with a loading rack near Winona in Smith County.

Wildcats in East Texas

Tom Bell is to start a Woodbine test immediately on a 12,000-acre block near New Boston in Bowie County, the block being located in the H. Bivins, W. Wright, D. M. Walker and Texas & Pacific Railway Co.'s Nos. 2, 3, 4, 5, 11, 12 and 13 Surveys.

The Purcell block centering in the G. W. Morris Survey, 1 mile south of Avinger in Cass County, has been turned to Lapan and Lovejoy of Kilgore, who will start a Woodbine test at once. It is in the southwest corner of the county.

George Kane is blocking acreage southwest of Ladonia in the southeast corner of Fannin County, and will start a test when 5,000 acres are assembled in the block.

E. B. Whittington and Hall Wood of Longview have assembled 3,000 acres centering in the H. Hoover Survey and J. Bradley Survey, 5½ miles east of Kilgore, and have made location for a Trinity test. The test will be on the G. O. Cunyus tract, approximately 1,500 feet east of the Gulf Production Co. and Byrd-Frost dry Woodbine test just east of the town of Kilgore in Gregg County. Being a Trinity test will make it especially interesting to all who have acreage in the field, and who are watching the district. If the test proves a producer from the Trinity sand it will lead to the drilling of other Trinity tests in the Woodbine sand field, possibly proving another pay horizon for the far flung field.

E. O. Butler of Durant, Okla., has taken 1,500 acres centering in the northwest corner of the J. Latham Survey, 7 miles south of Henderson, Rusk County, starting a test on the R. H. Gary farm.

COMPLETIONS IN EAST TEXAS

North Gregg County

Alma Petroleum Co.'s No 3 J. L. Younse, top sand 3,629 feet, initial production 60 bbls. per hour through 1-inch tubing choke, total depth 3,673 feet. Amerada Petroleum Corp.'s No. 3 Burnside, top sand 3,521 feet, initial production 84 bbls. per hour through three-fourths-inch tubing choke, total depth 3,556 feet; No. 5 Tooke, top sand 3,490 feet, initial production 74 bbls. per hour through three-fourths-inch tubing choke, total depth 3,522 feet. Arkansas Fuel Oil Co.'s No. 1 Burnside, top sand 3,465 feet, initial production 47 bbls. in one-fourth hour through 2½-inch tubing choke, total depth 3,515 feet; No. 2-A Taylor Lee, top sand 3,583 feet, initial production 31 bbls. in one-fourth hour through 2½-inch tubing choke, total depth 3,593 feet; No. 1 E. M. Whateley, top sand 3,535 feet, initial production 27 bbls. in one-fourth hour through 2½-inch tubing choke, total depth 3,552 feet.

Atlantic Oil & Production Co.'s No. 4 Bacle, top sand 3,632 feet, initial production 21 bbls per hour through tapered tubing, total depth 3,656 feet; No. 7-A Burnside, top sand 3,526 feet, initial production 22 bbls. per hour through three-fourths-inch tubing choke, total depth 3,549 feet; No. 5 T. B. Harris, top sand 3,493 feet, initial production 22 bbls. per hour through tapered tubing, total depth 3,546 feet. Atlantic and Sun Oil Co.'s No. 5 Hayes, top sand 3,506 feet, initial production 65 bbls. per hour through tapered tubing, total depth 3,565 feet. Atlantic Oil & Production Co.'s No. 7 T. W. Lee, top sand 3,589 feet, initial production 21 bbls. per hour through tapered tubing, total depth 3,647 feet; No. 4 J. Moore, top sand 3,501 feet, initial production 185 bbls. per hour through 2½-inch tubing, total depth 3,546 feet; No. 5 J C. McKinley, top sand 3,625 feet, initial production 21 bbls. per hour through tapered tubing, total depth 3,660 feet; No. 2 A. Tooke, top sand 3,537 feet, initial production 22 bbls. per hour through tapered tubing, total depth 3,582 feet. Atlantic and Wadley's No. 8 M. Turner, top sand 3,550 feet, initial production 23 bbls. per hour through tapered tubing, total depth 3,614 feet. Atlantic and Sun Oil Co.'s No. 4 William Anderson, top sand 3,462 feet, initial production 186 bbls. per hour through 2½-inch tubing, total depth 3,523 feet.

Bay Oil Corp.'s No. 3 J. M. Wheeler, top sand 3,668 feet, initial production 64 bbls. in one-fourth hour through 1½-inch tubing choke, total depth 3,588 feet. J. E. Beard and others' No. 3 Farrell, top sand 3,617 feet, initial production 70 bbls. per hour through open tubing, total depth 3,628 feet. Bridwell Oil Co.'s No. 2 Lockett, top sand 3,614 feet, initial production 30 bbls. in one-fourth hour through 1-inch tubing choke, total depth 3,669 feet.

Columbia Oil & Gas Co.'s No. 2 J. B. Doby, location abandoned; No. 2 A. Christian, top sand 3,591 feet, initial production 86 bbls. per hour through 1-inch tubing choke, total depth 3,636 feet. Coastal Drilling Co.'s No. 2 Alexander, top sand 3,550 feet, initial production 62 bbls. in 30 minutes through 2-inch tubing choke, total depth 3,570 feet. Cox and Hamon's No. 3-A fee, top sand 3,460 feet, initial production 59 bbls. per day through various chokes, total depth 3,559 feet. Cox, Hamon and Williams' No. 2 C. Rodden, top sand 3,564 feet, initial production 170 bbls. per hour through 2½-inch tubing, total depth 3,602 feet.

Deep Rock Oil Co.'s No. 5 H. Pritchard, top sand 3,504 feet, initial production 120 bbls. per hour through 1-inch tubing choke, total depth 3,564 feet. Devonian Oil Co.'s No. 6 Ingram, top sand 3,520 feet, initial production 120 bbls. per hour through three-fourths inch tubing choke, total depth 3,556 feet. F. Dodson and others' No. 1 Bacle, top sand 3,641 feet, initial production 80 bbls. per

hour through three-fourths inch tubing choke, total depth 3,656 feet.

East Texas Finance Co.'s No. 2 George Anderson, top sand 3,499 feet, initial production 100 bbls. per hour through 1-inch tubing choke, total depth 3,540 feet. H. M. Edwards and others' No. 2 Starr estate, top sand 3,586 feet, initial production 110 bbls. per hour through 2½-inch tubing choke, total depth 3,626 feet. Empire Gas & Fuel Oil Co.'s No. 3 T. W. Lee, top sand 3,529 feet, initial production 26 bbls. in 15 minutes through 2-inch open tubing, total depth 3,564 feet.

Gulf Production Co.'s No. 4 Fonville, top sand 3,507 feet, initial production 80 bbls. per hour through three-fourths inch tubing choke, total depth 3,529 feet; No. 9 Sheppard, top sand 3,480 feet, initial production 80 bbls. per hour through 1-inch tubing choke, total depth 3,512 feet.

Hamill and Smith's No. 1-A C. B. Everett, top sand 3,498 feet, initial production 80 bbls. per hour through 1-inch tubing choke, total depth 3,521 feet. Howard Petroleum Co.'s No. 4 A. Davis, top sand 3,549 feet, initial production 45 bbls. in 15 minutes through 1-inch tubing choke, total depth 3,591 feet. Humble Oil & Refining Co.'s No. 6 Killingsworth, top sand 3,601 feet, initial production 83 bbls. per hour through three-fourths inch tubing choke, total depth 3,648 feet. Kewanee Oil Co.'s No. 6 fee, top sand 3,540 feet, initial production 45 bbls. in 15 minutes through 2½-inch tubing choke, total depth 3,582 feet.

Magnolia Petroleum Co.'s No. 6 Jones, top sand 3,660 feet, initial production 132 bbls. per hour through 2-inch open tubing, total depth 3,683 feet; No. 4 J. A. Parnell, top sand 3,529 feet, initial production 136 bbls. per hour through 2-inch open tubing, total depth 3,563 feet. Marine Production Co.'s No. 3 W. H. York, top sand 3,597 feet, initial production 75 bbls. per hour through 1-inch tubing choke, total depth 3,589 feet.

J. H. Massey and others' No. 4 Orr, top sand 3,586 feet, initial production 40 bbls. in 10 minutes through 2-inch tubing, total depth 3,622 feet. W. A. McCommas' No. 2 George Anderson, top sand 3,515 feet, initial production 59 bbls. in 32 minutes through 1-inch tubing choke, total depth 3,554 feet.

Roeser and Pendleton's No. 1-B W. R. Nicholson, top sand 3,591 feet, initial production 59 bbls. in 23 minutes through 2-inch open tubing, total depth 3,614 feet. Red Star Oil Co.'s No. 3 W. D. Anderson, top sand 3,593 feet, initial production 70 bbls. per hour through three-quarters-inch tubing choke, total depth 3,623 feet. Roeser and Pendleton's No. 2-B W. R. Nicholson, no gauge, total depth 3,678 feet.

Selby and Lewis' No. 6 Ingram, top sand 3,505 feet, initial production 47 bbls. in one-quarter hour through 1-inch tubing choke, total depth 3,551 feet. Shell Petroleum Corp.'s No. 6 C. H. Slaton, top sand 3,572 feet, initial production 10 bbls. in one-quarter hour through tapered tubing, total depth 3,633 feet. Showers and Moncrief's No. 1 A. D. Bacle, top sand 3,619 feet, initial production 80 bbls. per hour through three-quarters-inch tubing choke, total depth 3,644 feet. Silver Star Oil Co.'s No. 2 George Anderson, top sand 3,505 feet, initial production 90 bbls. per hour through 1-inch tubing choke, total depth 3,531 feet. Simms and Stanolind Oil & Gas Co.'s No. 10-B J. J. Flewellen, top sand 3,670 feet, initial production 80 bbls. per hour through 2-inch tubing, total depth 3,680 feet. Sinclair Prairie Oil Co.'s No. 7 Isley, top sand 3,532 feet, initial production 59 bbls. in 20 minutes through 2½-inch open tubing, total depth 3,560 feet; No. 6 J. R. Williams, top sand 3,496 feet, initial production 59 bbls. in 20 minutes through 2½-inch tubing, total depth 3,535 feet. Stanolind-Simms and Peachblossom's No. 2 J. W. Akin, top sand 3,534 feet, initial production 60 bbls. in one-quarter hour through 1½-inch open tubing, total depth 3,619 feet. Stroube and Stroube's No. 2 Bumpass, top sand 3,451 feet, initial production 50 bbls. in 10 minutes through open tubing, total depth 3,490 feet; No. 1 Anderson heirs, top sand 3,498 feet, initial production 59 bbls. per day through various chokes, total depth 3,540 feet. Sun Oil Co.'s No. 2 Fuller, top sand 3,664 feet, initial production 37 bbls. per hour through tapered tubing, total depth 3,710 feet.

Tidal Oil Co.'s No. 6 W. E. Jones, top sand 3,639 feet, initial production 30 bbls. in 10 minutes through 2-inch open tubing, total depth 3,660 feet. C. Williams and others' No. 1 Brawley, top sand 3,481 feet, initial production 62 bbls. per hour through 1-inch tubing choke, total depth 3,514 feet. Wise and Jackson and others' No. 3 R. Corbin, top sand 3,617 feet, initial production 100 bbls. per hour through 2½-inch open tubing, total depth 3,630 feet. Woodley Petroleum Co.'s No. 3 T. B. Harris, top sand 3,560 feet, initial production 75 bbls. per hour through 1-inch tubing choke, total depth 3,675 feet. Yount Lee Oil Co.'s No. 3 Rodden, top sand 3,588 feet, initial production 71 bbls. per hour through eleven-sixteenths-inch tubing choke, total depth 3,602 feet; No. 3-A E. M. Watley, top sand 3,511 feet, initial production 79 bbls. per hour through eleven-sixteenths-inch tubing choke, total depth 3,531 feet.

South Gregg County

J. C. Beard's No. 2 E. Muckelroy, top sand 3,604 feet, initial production 30 bbls. in one-quarter hour through three-quarters-inch tubing choke, total depth 3,618 feet. Canadian Oil Production Co.'s No. 2 Jenkins and Hilburn, top sand 3,665 feet, initial production 60 bbls. in one-half hour through tubing choke, total depth 3,675 feet. A. C. Deck's No. 1 G. Davis, top sand 3,707 feet, initial production 54 bbls. per day pinched through tubing, total depth 3,715 feet. Golding and Murchison's No. 6 L. P. Griffin, top sand 3,570 feet, initial production 59 bbls. per day pinched, total depth 3,602 feet.

Gulf Production Co.'s No. 9 Alexandria, top sand 3,517 feet, initial production 90 bbls. per hour through three-quarters-inch tubing choke, total depth 3,532 feet; No. 9 M. T. Cole, top sand 3,540 feet, initial production 80 bbls. per hour through three-quarters-inch tubing choke, total depth 3,546 feet; No. 11 G. W. Culver, top sand 3,525 feet, initial production 64 bbls. per hour through three-quarters-inch tubing choke, total depth 3,559 feet; No. 21 Hilburn, top sand 3,696 feet, initial production 40 bbls. per hour through three-quarters-inch tubing choke, total depth 3,703 feet; No. 23 Hilburn estate, top sand 3,534 feet, initial production 85 bbls. per hour through three-quarters-inch tubing choke, total depth 3,550 feet; No. 2 A. Nichols, top sand 3,661 feet, initial production 22 bbls. per hour through three-quarters-inch tubing choke, total depth 3,669 feet; No. 3 R. H. Still, top sand 3,508 feet, initial production 60 bbls. per hour through three-quarters-inch tubing choke, total depth 3,548 feet; No. 4 R. H. Still, top sand 3,637 feet, initial production 40 bbls. per hour through three-quarters-inch tubing choke, total depth 3,583 feet.

Magnolia Petroleum Co.'s No. 1 Laird-Crim, top sand 3,574 feet, initial production 38 bbls. in one-fourth hour through 1-inch tubing choke, total depth 3,586 feet. O'Brien and others' No. 3 George Daniles, top sand 3,531 feet, initial production 40 bbls. in one-fourth hour through 1-inch tubing, total depth 3,571 feet. Pruitt and Standberry's No 1 M. B. Hughey, location abandoned. Sells Petroleum Corp.'s No. 3 E. Sibley, top sand 3,570 feet, initial production 59 bbls. per day pinched, total depth 3,623 feet. Shell Petroleum Corp.'s No. 4-B Bivens, top sand 3,630 feet, initial production 16½ bbls. in one-half hour through tapered tubing, total depth 3,636 feet.

Sinclair Prairie Oil Co.'s No. 6 S. G. Andrews, top sand 3,453 feet, initial production 25 bbls. in 10 minutes through open tubing, total depth 3,477 feet; No. 19-A A. A. King, top sand 3,459 feet, initial production 50 bbls. in one-fourth hour through open tubing, total depth 3,490 feet; No. 25-A A. A. King, top sand 3,462 feet, initial production 50 bbls. in one-fourth hour through open tubing, total depth 3,493 feet; No. 5-B A. A. King, top sand 3,436 feet, initial production 40 bbls. in 10 minutes through open tubing, total depth 3,465 feet; No. 4-B A. A. King, top sand 3,428 feet, initial production 25 bbls. in 10 minutes through open tubing, total depth 3,460 feet. Stanolind Oil & Gas Co.'s No. 1-B E. L. Walker, top sand 3,562 feet, initial production 57 bbls. in one-fourth hour through 1½-inch tubing, total depth 3,571 feet. Sun Oil Co.'s No. 6 M. T. Cole, top sand 3,523 feet, initial production 52 bbls. per hour through tapered tubing, total depth 3,560 feet; No. 4 Penticost, top sand 3,592 feet, initial production 46 bbls. per hour through tapered tubing, total depth 3,645 feet; No. 4 G. Reese, top sand 3,709 feet, initial production 63 bbls. per hour through tapered tubing, total depth 3,715 feet.

The Texas Company's No. 5 R. B. Walls, top sand 3,691 feet, initial production 160 bbls. per hour through open tubing, total depth 3,707 feet. Tidal Oil Co.'s No. 5 Lacy, top sand 3,540 feet, initial production 120 bbls. per hour through open tubing, total depth 3,550 feet. Winston Oil Co.'s No. 5 Paul Jones, top sand 3,690 feet, initial production 25 bbls. per hour through open tubing, total depth 3,697 feet.

North Rusk County

Abercrombie and Harrison's No. 9 Cantrell, top sand 3,636 feet, initial production 210 bbls. per hour through 1½-inch tubing choke, total depth 3,664 feet. Cordova Union Oil & Gas Co.'s No. 2 C. O. Christian, top sand 3,685 feet, initial production 50 bbls. per day pinched, total depth 3,690 feet.

Humble Oil & Refining Co.'s No. 55 Crim, top sand 3,660 feet, initial production 55 bbls. in one-half hour through three-fourths-inch tubing choke, total depth 3,707 feet; No. 3-A J. E. Sexton, top sand 3,680 feet, initial production 43 bbls. in one-half hour through three-fourths-inch tubing choke, total depth 3,748 feet; No. 4-A J. T. Sexton, top sand 3,636 feet, initial production 28 bbls. in one-half hour through three-fourths-inch tubing choke, total depth 3,724 feet. E. M. Jones and others' No. 3 D. Wills, top sand 3,640 feet, initial production 100 bbls. in one-half hour through 2½-inch open tubing, total depth 3,649 feet. Louisiana Oil & Refining Co.'s No. 2 Mayfield, top sand 3,636 feet, initial production 12 bbls. per hour by heads, through open tubing, total depth 3,717 feet. Magnolia Petroleum Co.'s No. 3 W. M. Jernigan, top sand 3,612 feet, initial production 84 bbls. in five minutes through 1-inch tubing choke on open flow line, total depth 3,661 feet. Republic Production Co.'s No. 4 C. E. Christian, top sand 3,636 feet, initial production 25 bbls. in 10 minutes through open tubing, total depth 3,639 feet. Weaver-Crim Corp.'s No. 1 Bean, top sand 3,618 feet, initial production 40 bbls. per hour through three-fourths-inch open tubing, total depth 3,737 feet.

South Rusk County

P. M. Biddison's No. 3 J. H. Wheelis, top sand 3,764 feet, initial production 90 bbls. in 30 minutes through open tubing, total depth 3,800 feet. British-American's No. 3 Ulsee Cooper, top sand 3,622 feet, initial production 60 bbls. in 15 minutes through open tubing, total depth 3,637 feet. Chaplin and Bass' No. 1 Pinkston, top sand 3,615 feet, initial production 149 bbls. per hour through open 2-inch tubing, total depth 3,644 feet. Deep Rock and Amerada Petroleum Corp.'s No. 3 Stovall, top sand 3,595 feet, initial production 160 bbls. per hour through 2½-inch open tubing, total depth 3,665 feet. Everts Drilling Co.'s No. 2 Joe Lee, top sand 3,735 feet, initial production 45 bbls. in 30 minutes through open 2½-inch tubing, total depth 3,738 feet. Golding and Murchinson's No. 3-A Pinkston, top sand 3,661 feet, initial production 125 bbls. per hour through open tubing, total depth 3,688 feet.

Gulf Production Co.'s No. 5-C Mayfield, top sand 3,683 feet, initial production 75 bbls. per hour through three-fourths inch tubing choke, total depth 3,691 feet; No. 5 B. B. Stone, top sand 3,795 feet, initial production 77 bbls. per hour through three-fourths inch tubing choke, total depth 3,801 feet; No. 10 G. C. Turner, top sand 3,723 feet, initial production 62 bbls. per hour through three-fourths inch tubing choke, total depth 3,728 feet.

Humble Oil & Refining Co.'s No. 3 J. D. Florey, top sand 3,711 feet, initial production 46 bbls. in 30 minutes through three-fourths inch tubing choke, total depth 3,746 feet; No. 5 W. B. Key, top

(Continued on Page 77)

EAST AND EAST CENTRAL TEXAS WILDCATS

Week Ending June 6

ANDERSON COUNTY

Company, well, farm name, section and block—	Remarks:
Roeser and Pendleton's No. 1 M. A. Davy, 660 ft. from N line and center of E and W lines of tract and survey, P. G. Adams Sur.	Derrick.
C. R. Wilmuth et al's No. 1 N. B. Watson, 500 ft. from W line and 4,850 ft. from N of S line of survey in 8¼ of 129-ac. tract, M. Main Sur.	T.D. 1,538 ft.

ANGELINA COUNTY

Helburt et al's No. 1 Long Bell Lumber Co., 160 ft. from S line and 200 ft. from E line of Sec. 9, H.&T.B. Sur.	Location.

BOWIE COUNTY

Burnham-Robertson and Greer's No. 1 F. O. Weiss, 850 ft. from N line and 200 ft. from W line of B. H. Williams 50-ac. tract, Jessie Dean Sur.	Drlg. 3,037 ft.
Les Timberlake's No. 1 C. E. McElwee, 250 ft. from S line and 450 ft. from W line of 160-ac. tract, M. A. Poer Sur.	Drlg. 2,672 ft.

CHEROKEE COUNTY

Bridges and Candler's No. 1 Berryman, center of Berryman tract, H. Kimble Sur.	S.D. 1,000 ft.
Mid-Kansas Oil & Gas Co.'s No. 2 H. D. Kelley, 330 ft. from S line and 1,215 ft. from E line of 86.3-ac. tract, M. De Los Santos Coy Sur.	Derrick.
Mid-Kansas Oil & Gas Co.'s No. 18 M. M. Cross, 880 ft. from N line and 537 ft. from W line of lease, E. B. Fowlkes Sur.	Drlg. 140 ft.
Mustang Oil Co.'s No. 1 Decker and Whiteman, east side of W 75 acres of S 150 acres of survey, 3 miles S of Maydelle, F. W. Fulgham Sur.	Drlg. 4,985 ft.
Pilot Oil Co.'s No. 1 Annie Kelley, center of 10-ac. lease, M. De Los Santos Coy Sur.	Derrick.
William A. Stone's No. 1 J. T. Perkins, 200 ft. from NW cor. of lease, Thomas Stanford Sur., 3 miles S of Ponta	S.D. 260 ft.
Dr. Tubbs et al's No. 1 J. H. Sharp, 330 ft. from N line and 71 ft. from E and W lines of 3¼-ac. tract, M. De Los Santos Coy Sur.	Drlg. 2,740 ft.
Wilson & Stubbs' No. 1 L. Robert, 450 ft. from S and 150 ft. from W line of lease, J. B. Wolfin Sur.	Set surface csg.

DELTA COUNTY

Commerce Oil Co.'s No. 1 Ablowich, 150 ft. from S line and 776 ft. from W line of H. D. Jewett 52-ac. tract, E. Chick Sur.	S.D. 3,733 ft.
Joiner et al's No. 1 Blackwell, 800 ft. S and 150 ft. from E lines of 275-ac. tract, Dunnetelle Sur.	Drlg. 2,250 ft.

ELLIS COUNTY

Armstrong's No. 1 Milton Cook, SE cor. of 50-ac. tract, S. Frederick Sur.	Drlg. 215 ft.
Clark Brooks' No. 1 Anderson, SE cor. of 3,900-ac. tract, 10 miles SW of Wachatchie, E. C. Branch Sur.	Location.
Community's No. 1 Reeves	Waiting on cmt. to set 100 ft.
E. M. Rogers' No. 1 John Lee Winn, 1,650 ft. from E and 150 ft. from S of Orland, Orlo Wheeler Sur.	S.D. 1,425 ft.
Worthen Petroleum Co.'s No. 2 Cerf, Mulligan Farm Sur., 50 ft. W of No. 1	Drlg. 1,900 ft.

Intensive Play in Crockett County

Deep Test to Be Drilled on Unitized Block. New Well in Northern Winkler County. Thirty Locations in Wichita Falls Area

By L. E. Bredberg
Fort Worth Bureau, The Oil and Gas Journal

FORT WORTH, Tex., June 6.—Stanolind Oil & Gas Co., Mid-Kansas Oil & Gas Co. and others' No. 1 Massie, which was drilled in the SE Section 47, Block UV, G.C.&S.F. Survey, Crockett County, in an effort to pick up the shallow gas horizon formerly encountered by other tests in the area, logged the gas pay at 1,271-73 feet, the well gauging 18,000,000 feet per day from this lime. Purpose of drilling this test was to obtain enough gas to drill an Ordovician test on a unitized block, which test will be drilled in Section 66 or 67 of the same survey, approximately 1½ miles northwest of the shallow gasser. The Superior Oil Co. of California had top leased acreage around this test, and the gasser was drilled to validate these leases.

This area has seen one of the most intensive lease plays West Texas has witnessed in a long time, many companies purchasing blocks, checkerboard acreage and royalty in this and various other parts of the county, principally on the basis of the proposed tests, or other future deep tests striking the Ordovician pay horizon from which nine deep wells are producing in the Big Lake Field, Reagan County, approximately 30 miles north.

The Stanolind Oil & Gas Co. will drill the deep test for the companies holding acreage in the unitized block. It will be the first deep test ever drilled in Crockett County for this pay. The company is now drilling a deep test in Irion County, and whether it will wait on tools and equipment from the Irion County test is not known. That test has been shut down for several weeks due to a fire on the derrick floor which caused a long shut down while waiting for repairs on drilling equipment. Drawworks are now being rigged up, pumps have been rigged up, and as soon as a motor is received and installed drilling will be resumed.

June Allowables

Allowable daily average production in Ector County in June will be the same as in May, and no change was made in the allowable production in Winkler County. The Yates Field in Pecos County was given an allowable of 65,000 bbls. per day. The "potential" production of the field is placed at 1,027,737 bbls. The Crane-Upton area gets an allowable of 16,700 bbls. per day. The Howard-Glasscock area is allowed 18,000 bbls. per day. This is divided as follows: Chalk, Roberts, Henshaw, Phillips and Coffee Pools 8,975 bbls.; West Extension, 9,025 bbls.

Andrews County

Fuhrman Petroleum Co.'s No. 1 Boner, in Section 24, Block A-43, Andrews County, which was brought in three weeks ago, is producing badly cut oil due to packer failing, letting in water. Tubing and packer were run to the bottom of the 6⅝-inch casing, but failed to hold out water and the well probably will be retubed with packer, or 5½-inch casing will be run and cemented. The well was drilled to 4,541 feet but plugged back, and shot with 390 quarts from 4,220-4,330 feet. Pay was topped at 4,254 feet with highest increase logged at 4,310 feet. It is the second producer the Fuhrman Petroleum Co. has produced in this area.

Howard-Glasscock Deepening

Two old producers in the Howard-Glasscock County area are rigging up to drill deeper, while one wildcat in Glasscock County, Penn Oil Co. and others' No. 1 Habenstreit in Section 47, Block 36, T.&P. Survey, was abandoned this week at a total depth of 3,810 feet. This was a unitized test drilled by the Penn Oil Co., Honolulu Oil Co., the California Co. and Humble Oil & Refining Co. Penn Oil Co. is drilling the well for the unit.

Pecos County had two locations this week, and one well was completed in the county.

Loving County

Tennant's No. 1 Martin in Section 66, Block 1, W.&N.W. Survey, 1¼ miles southeast of the Wheat Pool, Loving County, is to be tubed and is estimated good for 15 bbls. per day. It was given a 110-quart shot from 4,345-80 feet, increasing possibilities of the well which formerly appeared too small to produce. Fifteen barrels per day is small production, but oil in this pool is high gravity, has ready sale to the Paso-Tex Pipe Line Co., and the well would therefore be worth producing if it flows after tubing is run.

Northern Winkler County

Northern Winkler County is apparently due to get another well, Harry Adams' No. 1 Scarborough in Section 2, Block 77, Public School Lands Survey, logging a showing of oil at 2,820 feet with an increase at 2,835-40 feet, the well flowing 35 bbls. of oil in 24 hours. It formerly struck sulphur gas at 2,810-20 feet before picking up the lime pay. It will make a short extension to this old area.

RANGER AND WICHITA FALLS

There were three locations in Callahan County and two in Shackelford County this week, the total of all locations staked in the Ranger district for the week. There were two completions reported for Palo Pinto County, one for Parker and one for Stephens County. There were 30 locations staked in the Wichita Falls district, 12 in Archer, 2 in Jack, 2 in Cooke, 1 in Wichita, 1 in Wilbarger and 12 in Young County.

Drew Beams' No. 1 Jackson in Section 21, E.T.R.R. Survey, northern Callahan County, offset to a 72-bbl. producer from the 912-foot pay horizon, is drilling ahead after missing this pay. The owner hopes to find oil in commercial quantities in the 1,300-foot pay from which wells are producing 1,700 feet to the southeast.

Archer and Young Counties are the most active in the Wichita Falls district, the deep pay or Canyon series tests being the most interesting. The majority of these are located in the Chalk Hill area near Archer City.

Falls Refining Co.'s No. 1 Wilson in the northeast corner of Lot 3, Block 119, A.T.N.C.&L. Survey, Archer County, is promising a 2,100-foot extension to the Canyon series production since it logged broken pay at 2,196 feet, and broken sand at 2,212 feet. This will be an important southeastern extension to this new pay horizon if the well proves a commercial producer, and will further stimulate deep drilling in the area, especially in this direction from the main part of the pool. It is now fishing for parted pipe.

The Gulf Pipe Line Co. is to connect to the Deep Oil Development Co.'s No. 1, Lease 5, L. F. Wilson, located in Lot 2, Section 75, A.T.N.C.&L. Survey, the 3,000-foot northwest extension Canyon series well which was completed last week flowing 250 bbls. from total depth of 2,244 feet.

Deep Oil Development Co.'s six deep producing wells in the Chalk Hill area, Archer County, now have a daily potential of 2,256 bbls., but an allowance of only 547 bbls. daily, the Gulf Pipe Line Co. taking the oil. There are three other Canyon series wells in the area, owned by other producers. Total gas volume of three wells in the area measured 590,000 feet per day, and tested 2.6 gallons of gasoline per 1,000 feet of gas. The wells in the area have a high rock pressure, and have declined very little during the 14 months they have been on production, which makes Canyon series producers especially valuable, and the reason for many operators starting Canyon series tests, or proposing the starting of such tests in the area.

Fain and McGaha have completed three wells in the new area recently opened by them in Archer County. All wells are now on the pump, making 500 bbls. per day. Sand in this area is logged around 1,783-87 feet.

O. T. Anderson and others' No. 2 Abercrombie, west offset to the best producer in new Abercrombie area, Archer County, is estimated good for only 20 bbls. per day. It was shot with 50 quarts from 1,192-1,204 feet, but with no results. King Royalty Co's No. 1 Abercrombie is also disappointing as it is now shut down for orders at 1,212 feet, showing no oil. It is 1,500 feet southwest of production. E. H. Sharp and others' No. 1 Coffield in the same area, but rated as a wildcat test, is showing for a producer at a total depth of 1,200 feet. It logged an oil sand at 1,191-1,200 feet, and filled 200 feet with oil in 12 hours. It was shot with 40 quarts from 1,176-90 feet, and is estimated good for 5 or 10 bbls.

Rathke Oil Co. has made location for a 2,650-foot test in the northeast corner of Block 27, League 4, Denton County school lands, in southern Wichita County, on a 1,200-acre block. It will be drilled with rotary tools.

A. Z. Kouri and others will drill a 2,300-foot Canyon test in the northwest corner of Block 133, Harris Subdivision, central Archer County, 5 miles southwest of Chalk Hill. Rotary tools will be used.

Panhandle District

The Darby Oil Co. of Oklahoma is to drill a wildcat test on a block of acreage worked out by Merry Brothers and Perini of Tyler, Tex., 10 miles west and 1 mile south of Paducah on the Purcell land in Cottle County. It will be the first test drilled in this county in an exceptionally long time. The test will be 330 feet from the north and 990 feet from the east of Section 40, and will go to 4,500 feet. Cable tools will be used in drilling it.

Sunset Oil Co.'s No. 1 Dore in Section 318, Block 44, H.&T.C. Survey, Moore County, 1¼ miles southwest of the Shamrock Field, was placed on the pump and made only 10 bbls. per day at a total depth of 3,651 feet. It was plugged back to 3,625 feet and shot with 100 quarts from 3,585-3,615 feet before putting on pump. It will probably be plugged.

COMPLETIONS IN WEST TEXAS

Glasscock County

Humble Oil & Refining Co.'s No. 2 Arrington, top pay 2,278 feet, initial production 589 bbls., total depth 2,289 feet. Penn and others' No. 1 Habenstreit, dry and abandoned, total depth 3,810 feet.

Howard County

Schermerhorn's No. 4 Kloh, top pay 2,182 feet, initial production 68 bbls., total depth 2,530 feet.

Pecos County

Culberson Brothers' No. 8-B Monroe, top pay 471 feet, initial production 50 bbls. pumping, total depth 501 feet. Dittman and others' No. 1 Sanford, dry and abandoned, total depth 1,456 feet.

Reeves County

James-Milton's No. 1 Patterson, dry and abandoned, total depth 4,133 feet.

COMPLETIONS IN PANHANDLE DISTRICT

Childress County

C. L. Sloan and others' No. 1 B. P. Smith, temporarily abandoned at 5,000 feet.

Gray County

Skelly Oil Co.'s No. 9 East Schaffer, top pay 3,212-56 feet, shot 180 quarts 3,210-81 feet, initial production 265 bbls. swabbing, total depth 3,281 feet. The Texas Company's No. 8 Williams, old well drilled deeper, old total depth 2,673 feet, new total depth 2,747 feet, initial production 122 bbls., no oil increase. Humble Oil & Refining Co.'s No. 1 Jackson (old well drilled deeper), from total depth 3,033 feet to 3,038 feet, increase in oil 3,076-80 feet and 3,125-30 feet, increase in water 3,138—plugged back to 3,126 feet, initial production 225 bbls. Operators Royalty & Producing Co.'s No. 1 Ferguson (Eddington), old well deepened, old total depth 3,025 feet, initial

WILDCAT OPERATIONS IN WEST TEXAS

Week Ending June 6

Company, well, farm name, section and block—	Remarks—
BORDEN COUNTY	
Westyde Investment Co.'s No. 1 Looney, 990 ft. from S and E, Sec. 15, Blk. 31, Twp. 4n, T.&P. Sur.	Spudding.
BREWSTER COUNTY	
Brewster Oil Co.'s No. 1 fee, 2,640 ft. S and 2,598 ft. E of NW cor., Sec. 45, Blk. G-15, G.C.&S.F. Sur.	S.D. 1,935 ft.
E. L. Chapman's No. 1 Skinner, C SW SE Sec. 100, Blk. 2, G.C.&S.F. Sur.	S.D. 1,302 ft.
Link-Joiner's No. 1 McIntire, 853 ft. from S and 2,390 ft. from E, Sec. 31, Blk. 352, W. J. Mitchell Sur.	Rig.
Trans-Pecos Oil & Gas Co.'s No. 1 Jones, 930 ft. from N and 2,500 ft. from E of Sec. 18, Blk. G-15, G.C.& S.F. Sur.	S.D. 2,900 ft.
Van McPhail's No. 1 McIntyre, SE cor. Sec. 59, Blk. 352, 7 miles south Alpine	S.D. 1,750 ft.
CONCHO COUNTY	
Beesley et al's No. 1 Waring Estate, 400 ft. from N and E, Sec. 163, T.&N.O. Sur.	S.D. 1,700 ft.; set 8-in. csg.
Continental Oil Co.'s No. 1-D Cowden, 200 ft. from S and 2,492 ft. from E Sec. 18, Blk. X	Drlg. 2,370 ft.; 1,000 ft. oil in hole.
CROCKETT COUNTY	
Doleman & Moore's No. 1 Ferner, 2,135 ft. from N and 1,485 ft. from E of Sec. 36, Blk. 2, I.&G.N. Sur.	Spudded and S.D.
Stanolind Oil & Gas Co.'s No. 1 Massie, 660 ft. from S and 1,980 ft. from E, Sec. 47, Blk. UV, G.C.&S.F. Sur.	S.D. 1,273 ft. to tube; 18,195,000 ft.; gas at 1,271 ft.
The Texas Company's No. 1 B. B. Ingham, 330 ft. from S and 2,330 ft. from E line, Sec. 36½, I.&G.N. Sur.	Location.
COKE COUNTY	
Mid-Kansas Oil & Gas Co.'s No. 1 Hearn, 980 ft. from S and W, Sec. 271, Blk. 1-A, H.&T.C. Sur.	S. D. 1,580 ft.
DAWSON COUNTY	
Albaugh et al's No. 1 Robinson, C NW Sec. 46, Blk. M, E.L.&R.R. Sur.	To resume drilling.
ECTOR COUNTY	
Thomas et al's No. 1 Edwards, 330 ft. from S, 2,310 ft. from E, Sec. 38, Blk. 43, Twp. 3s, T.&P. Sur.	Drlg. 1,470 ft.
H. F. Wurts' No. 1 E. A. Ibbetson et al, 330 ft. from N and E lines of NW Sec. 16, Blk. 46, Twp. 3s, G. M. M.Br.&A. Sur.	Drlg. 3,612 ft.

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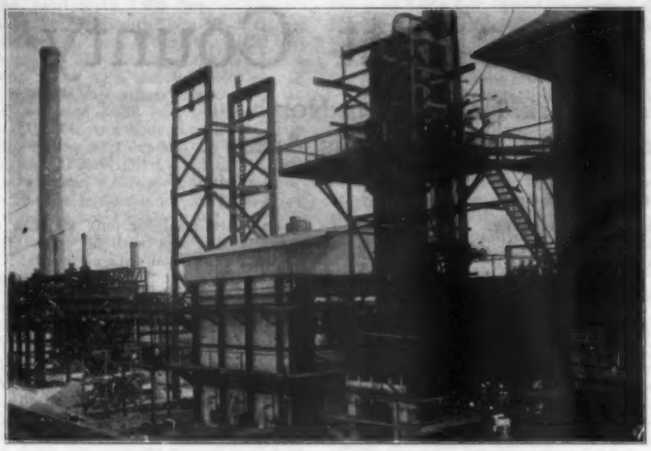

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production 25 bbls., new total depth 3,076 feet, increase in oil 3,045-52 feet, initial production 22 bbls. Phillips Petroleum Co.'s No. 6 Wood-Wright, top pay 2,706 feet, initial production 375 bbls., total depth 2,870 feet. Shamrock Oil & Gas Co.'s No. 3 Big Gray-Saunders, top pay 2,077-94 feet, shot 200 quarts 2,983-3,103 feet, initial production 394 bbls. swabbing, total depth 3,113 feet.

The Texas Company's No. 14 Bowers, old well deepened, old total depth 3,085 feet, new total depth 3,142 feet, increase in oil 3,110 feet, initial production 250 bbls., pumping; No. 4 Davis, old total depth 2,702 feet, new total depth 2,762 feet, initial production 865 bbls.; No. 7 Wright, top pay 2,755-70 feet, initial production 935 bbls. first 24 hours on gas lift, total depth 2,840 feet.

COMPLETIONS IN WICHITA FALLS DISTRICT

Archer County

Deep Oil Development Co.'s No. 1 Wilson, oil sand 3,614-30 feet, initial production 80 bbls., total depth 5,750 feet. Fain and McGaha's No. 1 Fain, oil sand 1,783-95 feet, initial production 200 bbls., total depth 1,795 feet; No. 1 Fain and McGaha, oil sand 1,783-87 feet, initial production 327 bbls. first 24 hours, total depth 1,787 feet; No. 1 Jackson, oil sand 1,790-92 feet, initial production 78 bbls., total depth 1,792 feet. Houston and Houston's No. 6 Browning, dry and abandoned, total depth 463 feet. C. E. Jones' No. 2 J. C. Thomas, oil sand 651-55 feet, initial production 6 bbls., total depth 655 feet. King Royalty Co. and Burns' No 1 Wilson, dry and abandoned, total depth 1,504 feet. C. E. McClutheon's No. 1 J. J. Perkins, dry and abandoned, total depth 1,763 feet. A. E. Stoute's No. 1 Wilson, dry and abandoned, total depth 2,500 feet

Anderson and Daubert's No. 1 Abercrombie, oil sand 987-1,003 feet, shot 100 quarts, initial production 208 bbls. daily, total depth 1,212 feet; No. 2 Abercrombie, oil sand 982-1,000 feet, initial production 10 bbls., total depth 1,218 feet. Ascot Oil Co.'s No. 1 Webb, location abandoned. M. M. Bradley's No. 1 Garrey, dry and abandoned, total depth 1,057 feet. L. T. Burns' No. 2 Logan, dry and abandoned, total depth 1,232 feet. Cable Oil Co.'s No. 2 Webb, oil sand 720-29 feet, initial production 100 bbls., total depth 729 feet. Continental Oil Co.'s No 3 Falls, shot 100 quarts, initial production 153 bbls., total depth 1,109 feet. King Royalty Co.'s No. 1 Abercrombie, dry and abandoned, total depth 1,259 feet. Lamont Drilling Co.'s No. 1 Webb, oil sand 689-701 feet, initial production 312 bbls. first 24 hours, total depth 701 feet. C. E. Leitz' No. 1 Logan and others, shot 40 quarts, initial production 12 bbls., total depth 1,228 feet.

W. E. Mason's No. 15 Gree, sandy lime 1,101-20 feet, shot 80 quarts, initial production 35 bbls., total depth 1,121 feet. Moran and Wotola's No. 1 Ikard, dry and abandoned, total depth 1,065 feet. Moran Drilling Co 's No. 5 Harmel, oil sand 1,427-33 feet, initial production 15 bbls., total depth 1,433 feet. Nix and Alexander's No. 1 Wilson, dry and abandoned, total depth 1,365 feet. Perkins and Cullum's No. 1 Abercrombie, oil sand 1,215-20 feet, initial production 15 bbls. oil and 5 bbls. of water, total depth 1,220 feet. Petroleum Producers Co.'s No. 1 Abercrombie, dry and abandoned, total depth 1,267 feet. The Texas Company's No. 1 Young, dry and abandoned, total depth 1,301 feet. Wolfe and others' No. 1 Davis, dry and abandoned, total depth 1,050 feet.

Baylor County

Consolidated Oil Co.'s No. 1-A Portwood, oil sand 1,369-1,410 feet, initial production 212 bbls., total depth 1,410 feet.

Montague County

Bridwell Oil Co.'s No 2 Tucker, oil sand 1,093-1,125 feet, 1,245-52 feet, initial production 125 bbls., total depth 1,252 feet.

Wichita County

F. C. Baldwin's No. 6 Dobie, dry and abandoned, total depth 610 feet. L. T. Burns' No. 9 Waggoner Brothers, dry and abandoned, total depth 830 feet. C. W. Clark's No. 3 Munger, oil sand 1,040-46 feet, initial production 20 bbls., total depth 1,046 feet. G. W. Cooper's No. 21 Waggoner Brothers, dry and abandoned, total depth 1,591 feet.

Petroleum Producers Co.'s No. 1 Chilson, dry and abandoned, total depth 1,916 feet. Schlaffke, Blair-Walton's No. 2 Honaker, dry and abandoned, total depth 1,352 feet.

Wilbarger County

C. H. Clark and others' No. 1 Waggoner, oil sand 1,888-96 feet, initial production 193 bbls., total depth 1,896 feet. John O'Neal's No. 1 Castleberry, oil sand 1,326-30 feet, initial production 10 bbls., total depth 1,547 feet.

Young County

Alexander and Wallace's No. 1 A. J. Lowe, dry and abandoned, total depth 602 feet. Cable Oil Co.'s No. 2 Williams, oil sand 570-77 feet, initial production 25 bbls., total depth 578 feet. W. R. Cooper's No. 1 Wilson, dry and abandoned, total depth 1,015 feet. L. P. Gaffney's No. 1 Lowe, dry and abandoned, total depth 738 feet. N. D. Goldsmith's No. 2 Wilson, oil sand 991-98 feet, initial production 70 bbls., total depth 998 feet. Hamilton and Lee's No. 1 Jeffery, dry and abandoned, total depth 820 feet. Iron Mountain Oil Co.'s No. 1 McBrayer, dry and abandoned, total depth 700 feet.

The Texas Company's No. 1 Kunke, dry and abandoned, total depth 1,909 feet. Underwood Drilling Co.'s No. 1 Eichelberger, dry and abandoned, total depth 852 feet. United Producers Co.'s No. 1-A Dunagan, oil sand 925-30 feet, initial production 32 bbls., total depth 930 feet. Iron Mountain Oil Co.'s No. 6 Tatum, oil sand 658-66 feet, initial production 75 bbls., total depth 666 feet; No. 7 Tatum, oil sand 658-66 feet, initial production 25 bbls., total depth 667 feet. King Royalty Co.'s No. 39 Larimore, oil sand 715-21 feet, initial production 90 bbls., total depth 721 feet. Kleiner and Riggs' No. 10 J. F. Larimore, dry and abandoned, total depth 730 feet; No. 12 Larimore, dry and abandoned, total depth 727 feet.

A. Z. Kouri's No. 1 McClatchey, dry and abandoned, total depth 943 feet. W. M. Maier's No. 1 McClatchey, dry and abandoned, total depth 915 feet. J. L. McMeens' No. 2 Hawkins, dry and abandoned, total depth 560 feet. Producers Co.'s No. 9 Finch, oil sand 661-70 feet, initial production 30 bbls., total depth 723 feet, plugged back to 673 feet. Reed and Beavers' No. 1 Slayton, dry and abandoned, total depth 833 feet. Regal Oil Co.'s No. 1-A Rushing, dry and abandoned, total depth 902 feet. A. H. and S. P. Schmitt's No. 208 Belknap, oil sand 662-65 feet, initial production 2 bbls., total depth 665 feet. Seitz-Comebys and Seitz's No. 2 Ellis, dry and abandoned, total depth 598 feet. Spann and McClung's No. 1 Stewart, dry and abandoned, total depth 635 feet. George W. Terrell and others' No. 6 Larimore, oil sand 670-74½ feet, initial production 15 bbls., total depth 674½ feet; No. 7 Larimore, dry and abandoned, total depth 689 feet.

F. E. Webb's No. 1 Haygood, dry and abandoned, total depth 762 feet. C. C. Williams' No. 2 Keith, dry and abandoned, total depth 750 feet; No. 1 Satto, dry and abandoned, total depth 535 feet. D. L. Wolf's No. 1 Cole, dry and abandoned, total depth 906 feet. Wooten Reed and Iron Mountain Oil Co.'s No. 1 F. V. Henson, dry and abandoned, total depth 998 feet. Dyer and others' No. 1 Allen, oil sand 2,239-41 feet, initial production 235 bbls., total depth 2,241 feet. W. S. Randell's No. 2 Kisinger, oil sand 2,550-2,605 feet, initial production 12 bbls., total depth 2,605 feet.

SALES ARGUMENT IN USE OF NATURAL

(Continued from Page 44)

line for 1 volume of butane in that case is the substitution of 2 volumes of butane-free natural gasoline; in other words, the surplus natural gasoline would have to be rectified first for complete removal of butane before it could be utilized under these conditions.

"Since the substitution value of bu-

tane for propane is 4.85, the substitution value of this typical natural gasoline for propane would be

$$3.05 \times 4.85 = 14.8.$$

Rectification for removal of propane is, therefore, one of the most effective steps for increasing the potential demand for natural gasoline. Every natural gasoline manufacturer who ships a gallon of propane to a refiner may destroy thereby substantially the potential demand for 15 gallons of natural gasoline of representative quality.

"From this brief review of the economic relations underlying rectification certain general conclusions may be drawn as regards the potential supply of liquefied gases. Propane may definitely be classified as a liquefied gas. Butanes are potential liquefied gases only to the extent to which they cannot be utilized in motor gasolines, or for uses in which a price can be paid for them at least equal to that of motor gasolines. Otherwise their inclusion in motor gasoline is preferable, both because of their desirable effect on volatility and on detonation properties. Improvements in automotive design for control of vapor locking and better balance between supply and demand for petroleum products will, therefore, probably lead to an increased utilization of butanes, perhaps both normal butane and isobutane, in motor gasolines and a corresponding curtailment of their use in liquefied gases. This contingency may as yet be remote, but it is reasonable to anticipate a trend in this direction."

EAST TEXAS FIELDS

(Continued from Page 74)

sand 3,701 feet, initial production 50 bbls. in 30 minutes through three-fourths inch tubing choke, total depth 3,706 feet; No. 12-A S. A. Plowman, top sand 3,708 feet, initial production 46 bbls. in 30 minutes through three-fourths inch tubing choke, total depth 3,746 feet; No. 9-A R. E. Silvey, top sand 3,622 feet, initial production 26 bbls. in 30 minutes through three-fourths inch tubing choke, total depth 3,711 feet; No. 6-B R. E. L. Silvey, top sand 3,636 feet, initial production 38 bbls. in 30 minutes through three-fourths inch tubing choke, total depth 3,746 feet; No. 4 J. E. B. Sneed, top sand 3,742 feet, initial production 38 bbls. in 30 minutes through three-fourths inch tubing choke, total depth 3,762 feet; No. 3-A Virginia Turner, top sand 3,700 feet, initial production 31 bbls. in 30 minutes through three-fourths inch tubing choke, total depth 3,740 feet. H. L. Hunt's No. 1-D Bradford, top sand 3,533 feet, initial production 8 bbls. per hour pumping, total depth 3,650 feet; No. 4 V. E. Reid, top sand 3,595 feet, initial production 37 bbls. per hour through open 2-inch tubing, total depth 3,695 feet; No. 5 Thrash, top sand 3,739 feet, initial production 40 bbls. in 15 minutes through open 2-inch tubing, total depth 3,776 feet.

McDonald Brothers' No. 1 Cora Hannah, top sand 3,620 feet, initial production 45 bbls. in 15 minutes through open 2½-inch tubing, total depth 3,657 feet. M. B. G. Oil Co.'s No. 4 Griffin, top sand 3,595 feet, initial production 60 bbls. per hour through open 2½-inch tubing, total depth 3,670 feet. Mid-Kansas Oil & Gas Co.'s No. 3 H. C. and G. W. Burton, top sand 3,650 feet, initial production 80 bbls. per hour, total depth 3,672 feet; No. 11 M. M. Cross, top sand 3,622 feet, initial production 80 bbls. per hour through open 2½-inch tubing, total depth 3,628 feet; No. 12 M. M. Cross, top sand 3,655 feet, initial production 30 bbls. per hour through open 2½-inch tubing, total depth 3,662 feet. Olson Brothers' No. 5 Powers, top sand 3,690 feet, initial production 45 bbls. in 30 minutes through open 2½-inch tubing, total depth 3,696 feet.

Sinclair Prairie Oil Co.'s No. 5 Ledbetter, top sand 3,675 feet, initial production 35 bbls. in 15 minutes through open 2½-inch tubing, total depth 3,685 feet; No. 2 W. H. McCord, junked hole, total depth 3,594 feet. Stanolind and Pure Oil Co.'s No. 7 R. A. Moores, top sand 3,590 feet, initial production 25 bbls. in 10 minutes through open 2½-inch tubing, total depth 3,645 feet; No. 6 W. H. Siler, top sand 3,592 feet, initial production 32 bbls. in 15 minutes through open tubing, total depth 3,612 feet. Sun Oil Co.'s No. 1 Ellen Till, top sand 3,571 feet, initial production 14 bbls. per hour, total depth 3,617 feet. Tex-Jersey Oil Co.'s No. 1 Cora Hannah, top sand 3,610 feet, initial production 60 bbls. per hour through open 2-inch tubing, total depth 3,633 feet. Ward Oil Co.'s No. 11 Thrash, top sand 3,754 feet, initial production 85 bbls. per hour through open 2-inch tubing, total depth 3,790 feet.

Smith County

Arcadia Refining Co.'s No. 3-A J. R. Green, top sand 3,795 feet, initial production 45 bbls. in 30 minutes through open tubing, total depth 3,801 feet. Johnson and Owens' No. 3 Jackson, top sand 3,749 feet, initial production 125 bbls. per hour through open tubing, total depth 3,756 feet. Pitzer and West's No. 1 L. S. Sartin, top sand 3,801 feet, initial production 45 bbls. in 20 minutes through tubing, total depth 3,804 feet. Sessions and others' No. 2 Sebe Stone, top sand 3,820 feet, initial production 15 bbls. in 20 minutes through three-eighths inch tubing choke, total depth 3,825 feet.

Smith County

Sinclair Prairie Oil Co.'s No. 12-C Jarvis, top sand 3,694 feet, initial production 35 bbls. in one-quarter hour through open tubing, total depth 3,698 feet; No. 11-A Mayfield, top sand 3,776 feet, initial production 45 bbls. in one-quarter hour through open tubing, total depth 3,785 feet; No. 13-A Mayfield, top sand 3,783 feet, initial production 45 bbls. in one-quarter hour through open tubing, total depth 3,787 feet; No. 18-A Mayfield, top sand 3,838 feet, initial production 45 bbls. in one-quarter hour through open tubing, total depth 3,841 feet; No. 19-A Mayfield, top sand 3,801 feet, initial production 45 bbls. in 20 minutes through open tubing, total depth 3,804 feet; No. 3 E. E. Moore, top sand 3,794 feet, initial production 45 bbls. in one-quarter hour through open tubing, total depth 3,797 feet; No. 8 R. G. Wright, top sand 3,676 feet, abandoned, total depth 3,680 feet. Smith-Guerin and King's No. 1 S. S. Cooke, top sand 3,697 feet, initial production 300 bbls. per hour through open tubing, total depth 3,700 feet. Sun Oil Co.'s No. 1-B J. J. Denton, top sand 3,728 feet, initial production 44 bbls. per hour through open tapered tubing, total depth 3,751 feet; No. 4-A A. V. Ritch, top sand 3,705 feet, initial production 48 bbls. per hour through open 2-inch tubing, total depth 3,706 feet.

Upshur County

Cal-Pet Corp.'s No. 6 Walker, top sand 3,650 feet, initial production 162 bbls. per hour through 2½-inch tubing, total depth 3,658 feet. Danciger Oil & Refining Co.'s No. 3 Stincomb, top sand 3,747 feet, initial production 60 bbls. per hour through 1-inch tubing choke, total depth 3,755 feet. Humble Oil & Refining Co.'s No. 3-B Eva O'Byrne, top sand 3,651 feet, initial production 79 bbls. per hour through three-quarters-inch tubing choke, total depth 3,664 feet. Magnolia Petroleum Co.'s No. 5 Blackwell, top sand 3,657 feet, initial production 120 bbls. per hour through open 2-inch tubing, total depth 3,692 feet. Shano Oil Co.'s No. 4 Doby Rodden, top sand 3,752 feet, initial production 100 bbls. per hour through three-quarters-inch tubing choke, total depth 3,762 feet. Sun Oil Co.'s No. 3 T. C. Ramey, top sand 3,732 feet, initial production 45 bbls. per hour through tapered tubing, total depth 3,754 feet. The Texas Company's No. 2 H. L. Phillips, top sand 3,695 feet, initial production 110 bbls. per hour through 2-inch open tubing, total depth 3,707 feet.

Polk County

Engleton Oil Co.'s No. 1 Saner-Ragley Lumber Co., dry and abandoned, total depth 1,570 feet. Taylor and others' No. 1 E. L. Duke, location abandoned.

Van Zandt County

Pure Oil Co.'s No. 5 W. F. Swain, initial production 120 bbls. first 24-hour gauge after choked for proration, total depth 2,958 feet.

BIG GASSER IN TIOGA FIELD MORE TEST WORK IN NEW YORK

By Special Correspondent

CORNING, N. Y., June 4.—The North Branch Development Co., operating in the Tioga Field in Pennsylvania, drilled its sixth gasser in the past week and has a 6,000,000-foot potential producer from Oriskany sand at 4,205-23 feet. This gives the North Branch company an open flow capacity of 28,000,000 feet. Its gas productiion is marketed through a pipe line of the Susquehanna Development Co. to Williamsport, Pa., where it is distributed by the Pennsylvania Power & Light Co. The new well is No. 1 Murray in Lawrence Township.

The Lycoming Natural Gas Co. has made locations for two wells in the Farmington area in Tioga County. One will be No. 3 Farr on a lease on which the company completed a 10,000,000-foot gasser and the other will be No. 1 Finch, an offset to a gasser on the Ida Russell farm, owned by the Penn United Gas Co. The Lycoming Gas Co. was still drilling on No. 1 Wheeler. It was reported at 5,650 feet, 66 feet in Oriskany sand, but with no showing. The Mutual Natural Gas Co. was drilling No. 2 R. R. Murray in Lawrence Township.

Over westerly in Potter County, Pennsylvania, J. B. Reed was drilling at 3,150 feet on the Champlin farm in Allegany Township and the Williamsport Natural Gas Co. is down 3,510 feet, and will install a 6,300-foot wire rope at its test. The Potter Development Co. has spudded in on the Matteson farm in Hebron Township and R. R. Hungiville is rigged up on No. 2 Sam Booth, the discovery lease in the Hebron gas field. G. H. Schrack is below 2,000 feet on the Tassel farm in Hebron Township and the Allegany Natural Gas Co. is drilling below 5,585 feet on the Emporium Lumber Co.'s property in the East Fork district.

Over easterly in Bradford County, Pennsylvania, the only active operation reported was the Troy Oil & Gas Co.'s No. 1 Mitchell, near Troy, which was drilling below 4,000 feet.

On the New York Side

Linderman Crane and Tri-State Gas & Electric Co.'s No. 1 VanZile, in the Rathbone gas field in Steuben County, New York, is in and is rated as a 1,000,000-foot gasser with a fair rock pressure, total depth 1,503 feet.

The Tri-State Gas & Electric Co. and others have a location for a test on the Bert Harry farm in the Rathbone area.

Word comes from Geneva, N. Y., that unnamed parties will start drilling a test on a block of 150 farms in Ontario County. The first test will be located on the Arthur Mower farm near Skuse's Corners, just north of Geneva.

Much interest is being manifested in the Ivers interests' No. 1 Pooley, on the Alpine anticline, near Campbell, Steuben County, which was last reported at 2,400 feet. Definite results were expected at 2,900 feet or above. This is a gas test and already has had several showings in upper sands. The acreage surrounding the well has all been leased.

Indications are that there will be a widespread exploration campaign on in New York state this summer, with gas as the objective. In last week's review it was related that tests would be drilled in Orleans and other counties, and since then word has come that Olean operators will drill near Fulton, in Oswego County, between Syracuse and Watertown; John F. Carpenter of Dundee, a pioneer operator in that gas field, is drilling on the Seneca View farms along Seneca Lake for Buffalo operators; Bolivar parties are drilling a test near Oneonta, Otsego County; the Glenn Oil & Gas Co. has made a location on the Isabella Phillips farm in the town of Reading, Schuyler County. In the same area Moyer, O'Neil and others are moving in on the Charles Perry farm and plan to drill two wells at least to test out this area. The Bigelow Gas Co. is drilling on the Frank Look farm outside Wayne Village. The Belmont Triangle Gas Co., which opened the Dundee Field, will drill three-quarters of a mile from a dry hole drilled by the Cunningham Gas Co. on the Ward farm near Penn Yan, Yates County. The Belmont company acquired a block of leases surrendered by the Cunningham company following the abandonment of the test. The area was gone over with seismograph and results prompted the Belmont organization to further test the structure.

EAST AND EAST CENTRAL TEXAS WILDCATS

(Continued from Page 74)

FRANKLIN COUNTY

Tom Harper's No. 1 fee, 150 ft. from N line and 200 ft. from E line of 116-ac. tr., W. M. Dawson Sur. ... T.D. 3,207 ft.; preparing to core.

T. E. Mayberry's No. 1 M. L. Edwards, 345 ft. from E line of lease and 6¼ miles NW of Mount Vernon, C. R. Miller Sur. ... Derrick.

GREGG COUNTY

Abernathy and Kirkpatrick's No. 1 Bramlett, 330 ft. from N and W lines of S 25 acres of 32-ac. tract, D. Sanches Sur. ... Derrick.

Alexander and Rassmussen's No. 1 Dixon, 335 ft. N and 169 ft. W of SE cor. of J. M. Dixon 106.5-ac. tract, I. Beaty Sur. ... Top sand 3,695 ft.; T.D. 3,697 ft.

Henry L. Allen's No. 1 Bonner Estate, 330 ft. from N and E lines of 19.4-ac. lease, J. McRae Sur. ... Preparing to shoot.

Arkansas Fuel Oil Co.'s No. 1 B. Rodden, 330 ft. from W line and center of N and S lines of lease, William Robinson Sur. ... Derrick.

Atlantic Oil Producing Co.'s No. 1 J. C. Judge, 510 ft. S and 1,545 ft. W of NE cor. of lease, F. W. Johnson Sur. ... Derrick.

D. M. Buffington's No. 1 Danley, 500 ft. W and 200 ft. N of NE cor. of Searight Blackman 100-ac. lease, W. P. Chisum Sur. ... S.D. 1,700 ft.

Burnham and Johnston's No. 1 Jackson-Sample, 150 ft. from N line of tract and S offset to Zion's No. 1 Barnett, Jacob Taylor Sur. ... Running csg. 3,765 ft.

Central Drilling Co. et al's No. 1 Castleberry, 150 ft. from N line and 69 ft. from S line, 150 ft. from W line and 450 ft. from E line of 4-ac. tract, D. Sanches Sur. ... Waiting on cmt. to set; T.D. 3,692 ft.

Cranfill & Reynolds' No. 1 fee, 330 ft. from W line and center of N and S lines of 8-ac. tract, J. Ruddle Sur. ... Waiting on cmt. to set 3,480 ft.

Cranfill & Reynolds' No. 1 L. Howard, 330 ft. from S line of lease and center of E and W lines, M. Scott Sur. ... Drlg. 2,010 ft.

Deaner et al's No. 1 M. T. Cole, 1,665 ft. from N line and 330 ft. from W line of lease, T. Johnson Sur. ... Moving in.

Dodd and Markey's No. 1 J. F. Holt, 615 ft. E and 707 ft. N of SW cor. of 200-ac. tract, H. Edwards Sur. ... Drlg. 1,085 ft.

Empire Gas & Fuel Co.'s No. 1 H. E. Thomas, 330 ft. from N line and E lines of lease, J. M. Morris Sur. ... Location.

Ealick and Bazzell's No. 1 J. H. Thomas, 225 ft. from N and S lines and 390 ft. from W line of N 15 acres of 65-ac. tract, H. F. Rogers Sur. ... T.D. 3,615 ft.; plugged back to 3,585 ft.; swabbing.

Export Petroleum Corp.'s No. 1 Coleman, center of Blk. No. 16, H. R. Hokit Sur. ... Drlg. 1,800 ft.

Farland Oil Co.'s No. 1 Doctor Goodman, center of S half of Blk. No. 150, M. V. Winkle Sur. ..... Derrick.
Fosh et al's No. 1 Stencil, center of Blk. No. 55, M. Dillard Sur. ..... Set csg.; T.D. 3,522 ft.
Gambrill et al's No. 1 Clayborn, 370 ft. S and 174 ft. E of NW cor. of Clayborn 50-ac. tract, J. Beaty Sur. ..... Rig up.
Lewis Godlin's No. 1 E. L. Walker, 330 ft. N of road, 330 ft. from E line of 80.3-ac. tract, M. Dillard Sur. .. Derrick.
Gulf Production Co.'s No. 1 J. Clayborn, center of 20-ac. lease, I. Beaty Sur. ..... Moving in.
Humble Oil & Refining Co.'s No. 1 H. Castleberry, 330 ft. from N and E lines of lease, B. H. Hampton Sur. ..... T.D. 3,493 ft.
Iowan Payne Oil Co.'s No. 1 Akins, 660 ft. from W line and center of N and S lines of lease, W. H. Castleberry Sur. ..... Derrick.
J. J. Petroleum Corp.'s No. 1 Cumi Wells, 330 ft. from S line and 390 ft. from E line of N 50 acres of 100-ac. tract, J. M. Morris Sur. ..... Rig up.
K. B. Oil Co.'s No. 1 Dickson, 150 ft. from S and 150 ft. from W of 5-ac. lease, Mary Van Winkle Sur. .... S.D. 700 ft.
Lovett-Norr et al's No. 1 Rufus Smith, 1,100 ft. from N line and 750 ft. from W line of lease, R. Slaughter Sur. ..... Set surface csg. 55 ft.
Magnolia Petroleum Co.'s No. 1 H. P. Hale, 330 ft. from N and W lines of 50-ac. lease, M. V. Winkle Sur. ..... Waiting on cmt. to set 3,550 ft.
Magnolia Petroleum Co.'s No. 1 N. Fowler, 140 ft. from N and S lines and 330 ft. from W line of 3.5-ac. tract, John Blair Sur. ..... Rig up.
Lee Masters' No. 1 Mrs. F. Thompson, center of Blk. No. 151, M. V. Winkle Sur. ..... S.D. 1,800 ft.
McVey et al's No. 1 Kelly Dixon, 140 ft. NW along corner line of street from E corner of Blk. No. 137 and 655 ft. SW at right angles, M. V. Winkle Sur. .. T.D. 3,547 ft.
Meridian Oil Co.'s No. 1 G. W. Richey, center of E 3 acres of 11-ac. tract, William Carlton Sur. ..... Rigging up.
J. C. O'Brien's No. 1 Maurice Prothro, 330 ft. from W line and center of N and S lines of 5.5-ac. lease, John Blair Sur. ..... Derrick.
J. D. Patty et al's No. 1 J. C. McCormick, 207 ft. SE at right angles to Gladewater-Tyler road and 540 ft. SW of Abernathy and Kirkpatrick's No. 1 Gregston, M. Dillard Sur. ..... Coring 3,582 ft.
E. A. Payne et al's No. 1 R. M. Woods, 20 ft. from S line and 31 ft. from W line of 2.13-ac. lease, H. R. Holit Sur. ..... Derrick.
Pennsylvania Oil & Refining Co.'s No. 1 Bonner, 693 ft. W and 330 ft. S of most easterly NE cor. of survey, James McRae Sur. ..... S.D. 3,589 ft.
Phillips and Lee's No. 1 R. M. Woods, center of Blk. No. 7, H. R. Holit Sur. ..... Drlg. 2,300 ft.
Pilot Oil Co.'s No. 1 P. McGeorge, 330 ft. from N line and center of E and W lines of 12-ac. lease, P. McAnnelly Sur. ..... Drlg. 3,507 ft.
Producers Investment Co.'s No. 1 R. H. Rowland, 150 ft. SW of Crim's No. 1 Producers, M. V. Winkle Sur. ..... Rig up and S.D.
Reeves et al's No. 1 W. L. Hestland, center of five-eighths-acre tract, midway from Lampton Church and Sarson's No. 2 Hall, D. Sanches Sur. ..... Drlg. 2,970 ft.
Rhodes Drilling Co.'s No. 1 J. E. Christian, 125 ft. from S line and center of W 2 acres of 4-ac. tract, G. W. Hooper Sur. ..... Drlg. 2,980 ft.
Frank Russell's No. 1 Crimm, center of one-half-acre tract, M. V. Winkle Sur. ..... Rig up and S.D.
Showers and Moncrief's No. 1 A. D. Bacle, center of W 5½ acres of N 11-ac. lease, G. W. Hooper Sur. .... Waiting on cmt. to set 3,553 ft.
Sinclair Prairie Oil Co.'s No. 1 A. A. King, 330 ft. from N line and 330 ft. from W line of lease, John Keiser Sur. ..... Set surface csg.
Smith and Merriwinkle's No. 1 Jim Gray, west offset to Houston and Heep's No. 4 Hall, D. Dainwood Sur. ..... Derrick.
H. K. Spear et al's No. 1 J. M. Dickson, center of 2-ac. tract, M. V. Winkle Sur. ..... Drlg. 2,400 ft.
Stroube and Stroube's No. 1 Finley and Thomas, 150 ft. from N line and 330 ft. from W line of 10-ac. lease, C. H. Alexander Sur. ..... Drlg. 2,448 ft.
Sun Oil Co.'s No. 1 J. M. Campbell, 330 ft. from S line ard center of E and W lines of lease, G. R. Rains Sur. ..... Derrick.
Travis and Crosby's No. 1 K. P. Lodge Lot, 210 ft. S of Gulf's No. 6 Alexandria and 40 ft. from center line of road, M. V. Winkle Sur. ..... Drlg. 2,300 ft.
T. J. Tucker's No. 1 Mary Rufus, center of one-half-acre tract, Mary Van Winkle Sur. ..... Rigging up standard rig; T.D. 3,636 ft.
Valentine Oil Co.'s No. 1 Goyne-Hughey, 6,100 ft. from S and 6,800 ft. from W of survey, Mary Van Winkle Sur. ..... Rig up.
Winona Oil Co.'s No. 1 Sumi-Wells, 330 ft. from S and E lines of tract, 550 ft. from S line of survey, J. M. Morris Sur. ..... Drlg. 100 ft.
Zion Oil Co.'s No. 1 Barnett, 260 ft. from E and W lines and 330 ft. from south L of lease, E half of W 50 acres of 150-ac. tract, Jacob Taylor Sur. .... Washing in; T.D. 3,751 ft.

HENDERSON COUNTY

B. L. Green et al's No. 1 M. H. Gussett, (old well drilled deeper), 150 ft. from N line and 1,000 ft. from W line of 105.5-ac. tract, 3 miles SW of Mabank, L. D. Stover Sur. ..... S.D. 930 ft.

HILL COUNTY

Sherman-Houseman's No. 1 J. F. Griffith, in Samuel Waddell Sur. ..... S.D. 3,256 ft.

HOPKINS COUNTY

Roark et al's No. 1 Taylor, 220 ft. from N and W lines of 80-ac. tract in the John Polk Sur. ..... S.D. 540 ft.

HOUSTON COUNTY

Nelson's No. 1 Harron, 300 ft. out of NE cor. of 327-ac. tract, J. P. Procella Sur. ..... Spudded and S.D. 87 ft.
T. B. Roberts' No. 1 Pennington, 750 varas W. of E line and 500 varas from S line of survey on 156-ac. tract, Ramond LaGarza Sur. ..... T.D. 2,660-66 ft.

HUNT COUNTY

Branson et al's No. 1 Gray ..... Location.
Russell et al's No. 1 Brooks and Quattlebaum ..... S.D. 1,455 ft.

KAUFMAN COUNTY

Standy Darnell et al's No. 1 Sally Pannill ..... S.D. 2,020 ft.

LAMAR COUNTY

G. W. Davy et al's No. 1 McGustion, 450 ft. from S line, 450 ft. from W line of farm and survey, Galet Wood Sur. ..... Temp. abnd.
Doyle and Jondeau's No. 1 Martin, 990 ft. from N line and 330 ft. from E line of tract, Joseph Deck Sur. ..... S.D. 2,446 ft.
Doyle and Jondeau's No. 1 Horn, 226 ft. from S line and 608 ft. from E line of lease, R. P. Mayor Sur. ..... Reaming; T.D. 2,890 ft.

LEON COUNTY

Saizer Drlg. Co.'s No. 1 Dr. J. M. Blair, 1,010 ft. from N line, 1,986 ft. from W line, Sec. 19, Blk. E, Lucia Hibbard Sur. ..... Derrick on ground.

MORRIS COUNTY

Leonard's (Tucker-Fullwood) No. 1 P. M. Staggers, 450 ft. from N line and 150 ft. from E line of 65.5-ac. tract, J. D. Nelson Sur. ..... T.D. 3,551-3,567 ft.; no show of oil and gas.

Olvey et al's No. 1 Gabriel Silbey, 330 ft. from N line and about 500 ft. from W line of lease, 3¼ miles NE of Carson, W. O. Matthews Sur. ..... S.D. 4,000 ft.
Geo. L. Pace's No. 1 Walcott, 330 ft. from N and E lines of most northerly NE cor. of survey, 3 miles S of Carson, D. A. Russell Sur. ..... Rig up.

NACOGDOCHES COUNTY

Adams et al's No. 1 Fuller Brothers, located in a 269-ac. tract, Jose Flores Sur. ..... Location.
Taylor-Vaughn's No. 1 Dixon Greer, 160 ft. from W and 450 ft. from N lines of 60-ac. tract in the M. G. Herrera Sur. ..... S.D. 265 ft.

POLK COUNTY

Sunshine Oil Co.'s No. 1 Brawley, 150 ft. from S line and 250 ft. from E line of W 100 acres of lease, F. Johnson Sur. ..... Rig up.
Taylor et al's No. 1 E. L. Duke, 330 ft. from N and W lines of 23.5-ac. tract, SW cor. of county, Peter J. Manard Sur. ..... Rig up.

RAINS COUNTY

C. H. Bayliss' No. 1 Ownby, 150 ft. N and 1,100 ft. from E of most easterly SE cor. of survey, Alexander Sur. ..... S.D. 4,036 ft.; to drill deeper.

RED RIVER COUNTY

Hoffman and Henson's No. 1 H. H. Lennox, 3,790 ft. W and 300 ft. S of most easterly NE cor. of survey, J. E. Edmondson Sur. ..... S.D. 60 ft.
Concord Oil Co.'s No. 1 J. R. Dellahunty, 500 ft. from N of Isaac Moore Sur. and 200 ft. E of E line of Robert Glass Sur. ..... S.D. 2,546 ft.
L. G. Priest's No. 1 W. C. Ware, 3¼ miles SE of English, 937 ft. from most southerly S line and 150 ft. from most easterly E line of 103.2-ac. tract, James Burkham Sur. ..... Derrick.

ROCKWALL COUNTY

Bucaaner Oil Co.'s No. 1 H. L. Lofland, center of 69-ac. tract in W. M. Bird Sur. ..... Set 10-in. csg. 130 ft.

RUSK COUNTY

Brooks Petroleum Co.'s No. 1 Mayfield, Daniel Clark Sur. ..... Top sand 3,622 ft.; waiting on standard rig; would not flow; T.D. 3,702 ft.
Butler and Calhoun's No. 1 C. C. Lowe, 225 ft. from N line and 200 ft. from E line of 85-ac. lease, W. G. Tutt Sur. ..... Waiting on cmt. to set 3,844 ft.
E. O. Butler's No. 1 R. H. Gary estate, 3,960 ft. from N line and 5,280 ft. from W line of survey, 10 miles S of Henderson, A. Latham Sur. ..... Rig up.
Butler and Calhoun's No. 1 W. P. Brett, 150 ft. from W line and center of N and S lines of 5-ac. lease, F. Cordova Sur. ..... Derrick.
Byrd-Frost's No. 1 Buckner, J. E. Peyton Sur. ..... T.D. 4,077 ft.; junked; will skid derrick.
G. & A. Oil Co.'s No. 1 W. Robinson, 321 ft. from S line and 330 ft. from W line of lease, T. J. Martin Sur. ..... Derrick.
M. H. Corbin et al's No. 1 E. B. Alford, center of Blk. No. 51, T. J. Moore Sur. ..... Drlg. 2,410 ft.
J. E. Crosbie's No. 1 Homer Leach, 330 ft. from W line of lease and center of N and S lines of 51-ac. lease, J. C. Barnett Sur. ..... Derrick.
F. W. Fair et al's No. 1 J. R. Alford, center of Blk. No. 24, T. J. Moore Sur. ..... Waiting on cmt. to set 3,570 ft.
Falcon Oil Co.'s No. 1 McCord, 322 ft. from S line and 168 ft. from E and W lines of 10-ac. lease, J. B. De Cadena Sur. ..... Location.
Gant-Gerwin and Wegener's No. 1 L. A. Till, 330 ft. from N line and 464 ft. from W and E line of 26-ac. lease and tract, M. V. Pena Sur. ..... Rigging up standard rig.
Gant and Garwin's No. 1 W. P. Moore, 330 ft. S and E of SW cor. of Arkansas, W. P. Moore 40-ac. tract, M. V. Pena Sur. ..... Location.
J. Guinn's No. 1 Neal Cooper, center of Blk. No. 36, T. J. Moore Sur. ..... Drlg. 3,220 ft.
Harris and Russell's No. 1 T. W. Harris, 330 ft. from S line and 660 ft. from W line of most southerly SW cor. of 160-ac. tract, 3 miles SW of Henderson, W. G. Davis Sur. ..... Derrick.
Hasting and Dodson's No. 1 E. B. Alford, center of Blk. No. 27, T. J. Moore Sur. ..... Derrick.
Hathaway et al's No. 1 Gray, J. M. McLain Sur. ..... Waiting on csg.; T.D. 3,519 ft.
Heiden-Rodgerson et al's No. 1 Barton and Birdwell, N offset to Reisinger et al's No. 1 Barton, W. G. Tutt Sur. ..... S.D. 3,727 ft.
Hendershot et al's No. 1 Green Washington, 330 ft. from N line and 250 ft. from W line of 11.75-ac. tract, D. Clark Sur. ..... Drlg. 500 ft.
W. F. Hollifield's No. 1 Wylie, 160 ft. from W and E line and 330 ft. from S line of 10-ac. lease, Juan Ximenes Sur. ..... T.D. 3,676 ft.
W. C. Know's No. 1 W. D. Peterson, center of 3.75-ac. tract, Jacob Lewis Sur. ..... S.D. 2,300 ft.; rig moved off.
J. J. Mundy's No. 1 Wood, 330 ft. S and W of SE cor. of Butler and Calhoun's Lowe lease, W. G. Tutt Sur. ..... Rig up.
Pace Petroleum Co.'s No. 1 Wells, W offset to East Texas, W. P. Chisum Sur. ..... Spudded.
Pansey Oil Co.'s No. 1 J. R. Glover, 250 ft. from E line and center of N and S lines of 8 acres of 16-ac. tract, J. Moore Sur. ..... Drlg. 2,397 ft.
Patterson Drilling Co.'s No. 1 W. N. Brightwell, center of 3.4-ac. tract, R. E. Winn Sur. ..... Waiting on cmt. to set 3,630 ft.
Ross Seward's No. 1 Burton, J. J. Y'Barbo Sur. ..... Skidded rig; S.D. 1,500 ft.
Jay Simmon's No. 1 D. C. Joyner, 2,050 ft. from S line and 300 ft from W line of 74.11-ac. tract, F. Cordova Sur. ..... Drlg. 3,076 ft.
Sabine et al's No. 1 J. R. Irion, 330 ft. from S and E line of 2-ac. tract, John Womack Sur. ..... Rig up and S.D.
Sinclair Prairie Oil Co.'s No. 1 J. W. Fletcher, 330 ft. from S line and 352 ft. from E and W lines of lease, William Clark Sur. ..... Derrick.
Snyder et al's No. 1 H. P. Leverett, 220 ft. from S line and 167 ft. from W line of tract, J. Lindley Sur. ..... Derrick.
Spansco Oil Co.'s No. 1 A. Holt, 625 ft. from S line and 103 ft. from W line of lease, D. Clark Sur. ..... Drlg. 2,765 ft.
W. L. Stearns' No. 1 Negro Church, center of tract, Juan Ximenes Sur. ..... Drlg. 2,800 ft.
Sun Oil Co.'s No. 1 Alph Lee, 2,323 ft. from E line and center of N and S lines of 94-ac. lease, Peter Tipps Sur. ..... Drlg. 2,400 ft.
R. H. Vice's No. 1 Neal Cooper, 315 ft. SW along NW line of Cooper tract and 141 ft. SE at right angles, T. J. Moore Sur. ..... Waiting on cmt. to set 3,650 ft.
Sam K. Vierson's No. 1 Will McCord, 330 ft. from S line and 180 ft. from E line of 5.45-ac. lease and tract, J. B. De Cadena Sur. ..... Waiting on cmt. to set 3,540 ft.
Watson and Butler's No. 1 G. W. Tipps, 330 ft. from S line and 600 ft. from W line of 18-ac. lease, H. M. Smith Sur. ..... Spudded and S.D.
Nat Wiseman's No. 1 Thrash, 177 ft. S and 87 ft. E of NW cor. of 62.6-ac. tract and 2½-ac. lease, F. Cordova Sur. ..... Derrick.
Paulett et al's No. 1 Ed Sparks, 350 ft. from E, 150 ft. from S of survey, L. C. Riggs Sur. ..... S.D. 1,465 ft.

SMITH COUNTY

Byers et al's No. 1 Cole, 330 ft. from E line and center of N and S lines of lease, E. Daniels Sur. ..... Rig up.
Joiner et al's No. 1 C. S. Jackson ..... S.D.; swabbed dry 3,955 ft.

J. E. Lucas' No. 1 Henry Jackson, 150 ft. from N and E lines of 25-ac. tract, James Jordan Sur. ....Set surface csg.
R. J. McMurray's No. 1 Frank Cole, 330 ft. from E line of lease and center of N and S lines of N 10.20-ac. lease, E. Daniels Sur. ....T.D. 3,772 ft.
Manahan Drilling Co.'s No. 1 S. S. Cooke, 150 ft. from N line and 450 ft. from E line of Blk. No. 9, Juan Vargus Sur. ....Waiting on cmt. to set 3,719 ft.
Robert S. Monroe, 330 ft. from S line and center of E and W lines of 12-ac. lease, D. Shaw Sur. ....Rig up.
Quintella McCullough's No. 1 Jessie Cole, 200 ft. from S line and center of E and W lines of 6-ac. lease, J. Jordan Sur. ....T.D. 3,740 ft.
Rabe et al's No. 1 Bateman, 332 ft. from S line and 278 ft. from E line of 15-ac. lease, James Jordan Sur. ....Derrick.
Smith Oil & Gas Co.'s No. 1 S. S. Cooke, 330 ft. S and 330 ft. W of SE cor. of Sinclair Prairie's E. E. Moores lease, Juan Vargus Sur. ....Waiting on cmt. to set 3,716 ft.
Sutton and Hawkins' No. 1 Church Lot, 210 ft. from S line and 180 ft. from W line of tract, James Jordan Sur. ....Drlg. 3,253 ft.
Alph Tillman et al's No. 1 Jessie Cole, 137 ft. from E line and 375 ft. from N line of 32-ac. lease, center of 5-ac. lease, James Jordan Sur. ....Drlg. 2,500 ft.

TITUS COUNTY

Perry V. Cook's No. 1 M. C. Rogers, center of SW of Moore Sur. ....T.D. 4,212 ft.

UPSHUR COUNTY

Conservative Oil Co.'s No. 1 E. O'Byrne, 350 ft. from N and E lines of 20-ac. lease, D. Ferguson Sur. ....Testing 3,739 ft.
Cranfill & Reynolds and Russ' No. 1 Williams, 330 ft. from S and E lines of lease, McKinley and Williams Sur. ....Drlg. 2,500 ft.
Faith Oil Co.'s No. 1 E. H. Brawley, 330 ft. E and W of NE cor. of The Texas Company's J. Williams 93-ac. lease ....Drlg. 2,650 ft.
Grover Hart's No. 1 Allen, 330 ft. from S and E lines of lease, one-half mile W of Mountain, Gonzales Sur. ....Derrick.
Hill Kimsey's No. 1 D. F. Smith, 466 ft. from S line and 1,165 ft. from E line of 266-ac. tract, J. R. Davis Sur. ....Derrick.
Pat Hudson et al's No. 1 D. F. Smith, 330 ft. out of SE cor. of W 100 acres of the N 200 acres of the 272-ac. lease, 3 miles E and 1½ miles N of Cranfill & Reynolds' No. 1 Rash, John Denson Sur. ....Waiting orders 3,710 ft.
Maddox Development Co.'s No. 1 Willie Starr, 602 ft. from S line and 330 ft. from W line of 96-ac. tract, C. H. Cooper Sur. ....Bldg. derrick.
Magnolia Petroleum Co.'s No. 1 L. Graves, 354 ft. from N line and S line and 1,017 ft. from E and W lines of lease, M. Irwin Sur. ....Derrick.
Mannas and Snuggs' No. 1 G. C. Pool, 330 ft. from N and W lines of 55-ac. tract, S. J. Poer Sur. ....Drlg. 1,128 ft.
J. C. McFarland et al's No. 1 Willie Starr, center of S 40 acres of Starr 96-ac. tract, Charles Cooper Sur. ....S.D. 3,523 ft.
Mudge Oil Co.'s No. 1 A. L. Shelton, 330 ft. from S and W lines of 8.8-ac. lease, D. Ferguson Sur. ....Drlg. 2,400 ft.
Pitts et al's No. 1 H. Davis, center of 7.5-ac. lease, W. R. Stephens Sur. ....Derrick.
S. D. Reynolds' No. 1 W. R. Nichols, 330 ft. from S line and center of E and W lines of N half of Miller and Reynolds lease, M. Mann Sur. ....Set surface csg.
Sorrells and Owens' No. 1 J. W. Free, 330 ft. from S and E lines of lease, William King Sur. ....Drlg. 3,100 ft.
J. Thomas Cox et al's No. 1 L. B. Miller, 330 ft. from S and E lines of 104.4-ac. tract ....Location.
A. A. Trammell et al's No. 1 E. H. Hampton, 330 ft. from S and E line of S 40 acres of E 160 acres of 192-ac tract, William King Sur. ....Top sand 3,686 ft.; S.D. 3,693 ft.
Webster's No. 1 R. H. McClelland, 1,966 ft. E and 385 ft. S of NW cor. of 751-ac. tract, M. P. Del Torres Sur. ....Derrick.
G. L. Wickliffe et al's No. 1 M. E. Florence, center of 41.5-ac. lease, M. Chandler Sur. ....Drlg. 3,117 ft.

VAN ZANDT COUNTY

Barton et al's No. 1 C. L. Hubbard, 600 ft. out of NE cor. of Hubbard 225-ac. tract, 3½ miles S of Canton. M. J. DeCadena Sur. ....S.D. 2,405 ft.
Kelly O. & G. Co.'s No. 1 Lemsford, center of Lemsford tract, John Conner Sur. ....S.D. 2,300 ft.
Pure Oil Co.'s No. 2 N. R. Blake, 501 ft. S of N line and 225 ft. W of E line of lease, John Walling Sur. ....Cmt. setting 2,990 ft.
Pure Oil Co.'s No. 3 B. W. Russell, 650 ft. W of E line of 30-ac. tract, David Rose Sur. ....Drlg. 2,619 ft.
Pure Oil Co.'s No. 6 Mary P. Neill, 700 ft. S and 225 ft. W of A. W. Ellison 67-ac. tract, James Rose Sur. ....Location.
The Texas Company's No. 6, 1,044 ft. N of S line and 59 ft. W of E line of lease, John Walling Sur. ....Cmt. setting.
Van Oil Association's No 1 Tankersley, 300 ft. from E and 1,000 ft. from S of farm, L. Vanders Sur. ....T.D. 2,850 ft.

WOOD COUNTY

Talko Oil Co.'s No. 1 G. T. Ross, B. L. Smith Sur. ....S.D. 3,150 ft.
Wood County Dev. Co.'s No. 1 Davis, approximately 180 ft. from S line of 160-ac. tract and 2½ miles S of Kantes in Sarah McDonald Sur. ....Rig up.

WILDCAT OPERATIONS IN WEST TEXAS

(Continued from Page 75)

EL PASO COUNTY

Tri-State Oil Co.'s No. 1 Bobadella, 1,325 ft. from S and E lines Sur. 254, S.P. No. 7,247 ....S.D. 2,257 ft.

FISHER COUNTY

Condor Petroleum Co.'s No. 1 Steele, 460 ft. from S and 330 ft. from W of W half of SE Sec. 216, B.B.B.&C. Ry. Sur. ....Fishing 2,615 ft.
Cranfill & Reynolds' No. 1 George, 400 ft. from N and 330 ft. from E. Sec. 200, Blk. 1, B.B.B.&C. Sur. ....T.D. 5,347 ft.; fishing.
Sinclair-Prairie's No. 2 Steele, 350 ft. from N and W of NE Sec. 73, H.T.&B. Sur. ....S.D. 2,392 ft.; straightening crooked hole.
Southern Oil Co.'s No. 1 Purdue, 990 ft. from S and E Sec. 202, Blk. B, B.B.&C. Sur. ....Machine.

GAINES COUNTY

McElreath et al's No. 1 Sparks, 330 ft. from N and E Sec. 397, Blk. G ....Drlg. 415 ft.

GLASSCOCK COUNTY

Kirby et al's No. 1 Baker, 330 ft. from N and W Sec. 23, Blk. 33, Twp. 2s, T.&P. Sur. ....Deepening from 2,285 ft.
Mann et al's No. 1 fee, 330 ft. from N and 1,980 ft. from E, Sec. 27, Blk. 34, Twp. 3s, T.&P. Sur. ....Drlg. 3,025 ft.

GARZA COUNTY

Penny & Posey's No. 1 Justice, 1,980 ft. from S and 1,650 ft. from E of Sec. 25, Blk. 6, H.&G.N. Sur. (3,500-ft. cable tool test) ....S.D. 3,390 ft.

HOWARD COUNTY

American-Maracaibo's No. 5-A Settles, 1,896 ft. from N, 1,884 ft. from W, Sec. 6, Blk. 32, T.&P. Sur. ....Cmtd. 12½-in. csg. at 185 ft.
F. H. E. Oil Co.'s No. 1 Denman, 330 ft. from N, 2,310 ft. from E of Sec. 14, Blk. 30, T.&P. Sur. ....T.D. 2,812 ft.; cleaning out after 400-qt. shot; T.P. 2,706 ft.
Green O. & R. Co.'s No. 1 Denman, 990 ft. from S and 2,310 ft. from W, Sec. 14, Blk. 30, Twp. 1s, T.&P. Sur. ..Spudded and S.D.
Harrison's No. 2 Denman, 1,650 ft. from S and 355 ft. from E Sec. 10, Blk. 30, Twp. 1s, T.&P. Sur. ....T.P. 2,530 ft.; T.D. 2,850 ft.; cleaning out after shot.
Myers et al's No. 1 Denman, 2,305 ft. from S and 2,320 ft. from E Sec. 14, Blk. 30, Twp. 1s, T.&P. Sur. ....S.D. 1,030 ft.
Pure Oil Co.'s No. 12 Chalk, 1,650 ft. from N and E, Sec. 125, Blk. 29, W.&N.W. Sur. ....Drlg. 1,590 ft.
Schermerhorn Oil Co.'s No. 5 Kloh, 660 ft. from S and W of Sec. 13, Blk. 33, Twp. 2s, T.&P. Sur. ....Drlg. 1,850 ft.
Sinclair-Prairie Oil Co.'s No. 2 Dodge, 2,313 ft. from S and 300 ft. from W, Sec. 11, Blk. 30, Twp. 1s, T.&P. Sur. ....Drlg. 1,800 ft.
Wallace et al's No. 1 Belt, 1,960 ft. from N, 2,640 ft. from W, Sec. 12, Blk. 30-1s, T.&P. Sur. ....T.P. 2,480 ft.; T.D. 2,855 ft.; to shoot again.

IRION COUNTY

Apollo Oil Co.'s No. 4 Nutt, 504 ft. from N and 1,562 ft. from W of Subd. No. 6, Gonzales County School Land ....Drlg. 410 ft.
Davis et al's No. 1 Suggs, 1,560 ft. from S and 925 ft from W, Sec. 2,051, Blk. 28, H.&T.C. Sur. ....Drlg. by tools 7,535 ft.
Johnson's No. 1 Tankersley, 1,340 ft. from S and 150 ft. from E, Sec. 726, F. Sockstedt Sur. ....T.D. 1,398 ft.; plugged back to 1,301 ft.
Stanolind Oil & Gas Co.'s No. 1 Williams, 1,320 ft. from S and E of Sec. 1,196, T.T.R.R. Sur. ....S.D. 7,420 ft.

JONES COUNTY

Abers et al's No. 1 Burton, 150 ft. from S and 175 ft. from E of 43.4-acre tract in G. Martinez Sur. ....S.D. 1,005 ft.; temp. abnd.
Johnson's No. 1 Huddleston, 165 ft. from S and W of N half of N half of Sec. 39, Blk. 18, T.&P. Sur. ....Spudded and S.D.
J. M. Johnson's No. 1 Swann, 6,150 ft. from S and 1,650 ft. from E. I. Miley Sur. ....Fishing 11t 925 ft.
Robert Oil Co.'s No. 1 Swann, 2,350 ft. from W and 2,920 ft. from S. I. Miley Sur. ....Rigged up.
Smart & Reynolds' No. 1 Reynolds, 2,500 ft. from N and 150 ft. from W, Sec. 2, W. T. Scott Sur. No. 3 ..S.D. 175 ft.
Southern Oil Co.'s No. 1 Sears, 300 ft. from S and W J. H. Grayson Sur. ....Rig.
C. S. Spelling et al's No. 1 Lillie, 200 ft. from N and W Sec. 4, E. Miller Sur. No. 2 ....Drlg. 1,675 ft.
Transcontinental Prod. Co.'s No. 1 Rust, 5,800 ft. N and 995 ft. W of SE cor. J. J. Hughes Sur. 556 ....Spudded.
Young et al's No. 1 Harrell, 150 ft. from S and E of N half of Sec. 8, O.A.L. Sur. ....Location.

LOVING COUNTY

Eppenauer's No. 1 Freels, 1,262 ft. from NE, 410 ft. from NW, Sec. 92, Blk. 1, W.&N.W. Sur. ....Drlg. 3,375 ft.
Covey et al's No. 1 Wheat, 2,310 ft. from SW, 330 ft. from SE, Sec. 3, Blk. 2, W.&N.W. Sur. ....S.D. 1,300 ft.
Eppenauer Drlg. Co.'s No. 1 Allen, 465 ft. from NE and SE, Sec. 4, Blk. 2, W.&N.W. Sur. ....Drlg. 3,625 ft.
Ervin & Mahres' No. 1 Thrope, 2,310 ft. from E and 330 ft. from S, Sec. 46, Blk. 53, T.&P. Sur. ....S.D. 810 ft.
Fair Lawn Syndicate's No. 1 Brookfield, 330 ft. from N and W, Sec. 30, Blk. 29, P.S.L. ....Drlg. 625 ft.
Falbre & Evans' No. 1 Dean, 330 ft. from NE and 990 ft. from NW, Sec. 79, Blk. 33, H.&T.C. Sur. ....Fishing 4,275 ft.
Goldman et al's No. 1 Allen, 330 ft. from NE and NW of Sec. 90, Blk. 1, W.&N.W. Sur. ....Drlg. 300 ft.
Lewis & Slagel's No. 1 Johnson, 330 ft. from N and 1,650 ft. from W, Sec. 6, Blk. 56, Twp. 1, T.&P. Sur. ..S.D. 2,280 ft.
Martin's No. 1 Freels, 3,514 ft. from NE and 412 ft. from NW of Sec. 92, Blk. 1, W.&N.W. Sur. ....T.D. 4,051 ft.; setting csg.
Martin et al's No. 1 Wheat, 990 ft. from SW and SE, Sec. 83, Blk. 1, W.&N.W. Sur. ....Material on ground.
Miller et al's No. 1 Ferguson, 990 ft. from N and E of Sec. 44, Blk. 29 ....S.D.
Tennant et al's No. 1 Martin, 990 ft. from NW and SW, Sec. 66, Blk. 1, W.&N.W. Sur. ....T.D. 4,388 ft.; shot 110 qts. 4,345-88 ft.; flowing 30 bbls. oil every other day.
Thomas' No. 1 Wheat, 2,310 ft. from NW, 990 ft. from NE, Sec. 83, Blk. 1, W.&N.W. Sur. ....Drlg. 3,475 ft.

MENARD COUNTY

Priest's No. 1 Sorrel, 1,000 ft. from E and 200 ft. from S cor., Sec. 132, E.L.R.R. Sur. ....S.D. 2,860 ft.

PECOS COUNTY

Anderson's No. 1 Lee Fever, 330 ft. from N and W of Sec. 78, Blk. 8, H.&G.N. Sur. ....S.D. 2,037 ft.
Corvette Oil Corp.'s No. 8 H. Monroe, 1,040 ft. from E line and 150 ft. from N line of Sec. 39, G.C.&S.F. Sur., Blk. 194 ....Location.
Culberson Bros.' No. 9-B Monroe, 150 ft. from N and 330 ft. E of No. 2 in Sec. 39, Blk. 194, G.C.&S.F. Sur. ..Location.
Gulf Prod. Co.'s No. 34 Yates, 13,415 ft. from W and 330 ft. from S of Runnells County School Land .... T.D. 1,258 ft.; T.P. 1,132 ft.; flowing; plugged back to 1,243 ft.
Hampton et al's No. 1 Byrne, 1,980 ft. from NW and 1,500 ft. from NE, Sec. 54, Blk. 10, H.&G.N. Sur. ... T.D. 1,395 ft.; T.P. 1,356 ft.; S.D. for tubing.
Sneed Oil Co.'s No. 4 Tippett, 450 ft. N and 300 ft. E of C of S line of Sec. 40, Blk. 194, G.C.&S.F. Sur. ....Location.

PRESIDIO COUNTY

Sadler et al's No. 1 Bledsoe, 2,640 ft. from N and W Sec. 15, Blk. 354, G.C.&S.F. Sur. ....S.D. 328 ft.

REAGAN COUNTY

Big Lake Oil Co.'s No. 6-C University, 1,370 ft. fro mS and 1,000 ft. from E, Sec. 12, Blk. 2 ....Fishing 8,367 ft.
Big Lake Oil Co.'s No. 7-C University, 1,570 ft. from W and 725 ft. from S, Sec. 35, Blk. 9 ....Drlg. 4,030 ft.
Group Oil Corp.'s No. 5-B University, 2,700 ft. from S and 1,775 ft. from W, Sec. 36, Blk. 9 ....Drlg. 2,000 ft.

REEVES COUNTY

F. McDorman et al's No. 1 Ray Roberts et al, 2,310 ft. from S and E lines of Sec. 22, Blk. 59, P.S.L. Sur. ...S.D. 390 ft.
Southern Star Oil Co.'s No. 1 Wright, 1,320 ft. from S and W, Sec. 58, Cassel's Sur. ....S.D. 75 ft.
Lee O. White et al's No. 1 Hershersor, 330 ft. from N and W lines of Sec. 6, Blk. 51, Twp. 10, T.&P. Sur. ..S.D. 5,044 ft.

RUNNELS COUNTY

Blue Bonnett Oil Co.'s No. 1 McMillan, 1,368 ft. from N and 660 ft. from W, Sec. 22, N. Travis Sur. ....S.D. 1,850 ft.
Dutton et al's No. 1 Dean, 5,475 ft. from NE and 1,048 ft. from NW in J. Heil Sur. No. 519 ....S.O. 3,417-20 ft.; S.D. 3,600 ft.

SCHLEICHER COUNTY

Eastland Oil Co.'s No. 1 Joe Tisdale, C Sec. 39, Blk. M, G.H.&S.A. Sur. ....S.D. 5,410 ft.; moving in new engine.
Wesner et al's No. 1 Nicks, 2,310 ft. from N and 2,302 ft. from E of Sec. 77, Blk. LL, T.C. Sur. ....S.D. 5,580 ft.
George Wilson's No. 1 Page, Sec. 40, Blk. L, 1,290 ft. from N, 1,570 ft. from W, G.H.&S.A. Sur. ....S.D. 5,053 ft.

SCURRY COUNTY

G. E. Dickman et al's No. 1 F. C. Davis, 1,000 ft. N and 1,770 ft. W of SE cor. of Sec. 275, Blk. 2, E.&T.C. Sub. ....S.D. 5,050 ft.
W. S. Guthrie's No. 1 Snyder National Bank, 330 ft. from N and 2,310 ft. from E of Sec. 115, Blk. 97, H.&T.C. Sur. ....Spudded.
Scurry County Oil Exchange's No. 1 Earnest, 2,310 ft. from N and W, Sec. 48, Blk. 3, H.&G.N. Sur. ....Spudded and S.D.
Seifert & Dibble's No. 1 T. M. Blackburn, 2,310 ft. from N and 2,310 ft. from W line of Sec. 153, Blk. 97, H.&T.C. Sur. ....S.D. 4,826 ft. for casing.

TERRELL COUNTY

Big Bend Oil Co.'s No. 1 Bassett, C NW Sec. 155, Blk. D, M.-K.-T. Sur. ..... S.D. 2,269 ft.
Keck Fecos Trust Co.'s No. 1 Hamilton, C Sec. 6, Georgetown Ry. Sur. ..... S.D. 3,150 ft.; moved off tools.
Miller Bros.' No. 1 Allison & Burke, C NW Sec. 16, Blk. 176, T.&P. Sur. ..... S.D. 120 ft.
Mid-Kansas Oil & Gas Co.'s No. 1 Goode, 2,152 ft. from E and 330 ft. from S, Sec. 26, Blk. 161, G.C.&S.F. Sur. S.D. 6,130 ft.
Jones et al's No. 1 Pankenham, C SE NW Sec. 43, Blk. B-2, C.C.S.D.&R.G.N.G. Sur. ..... S.D. 2,545 ft.
Sides et al's No. 1 Phelps, 2,157 ft. from N and 2,482 ft. from W, Sec. 5, G. W. Hurley Sur. ..... S.D. 1,435 ft.

TOM GREEN COUNTY

Belding & Dutton's No. 1 Norsworthy, 1,340 ft. from S and 587 ft. from E of John McNeese Sur. ..... S.D. 740 ft.; S.O. and gas 735 ft
Mintex Oil Co.'s No. 1 Campbell Est., 446 ft. from S and 630 ft. from W of Sec. 180, Dist. No. 11, S.P. Sur. S.D. 1,994 ft.
Pratt & Hancock's No. 2 Lewis, 166 ft. N and 330 ft. E of most northerly SW cor. of Joshua S. Grant Sur. No. 2 ..... S.D. 260 ft.

UPTON COUNTY

Farley et al's No. 1-B Lone, 2,310 ft. from N and E. Sec. 36, Blk. 1, M.-K.-T. Sur. ..... T.P. 2,182 ft.; T.D. 2,308 ft.; to test.

VAL VERDE COUNTY

Couch et al's No. 1 J. P. Yoas, 1,300 ft. from the N line and E line of Sec. 31, Blk. 1, I.&G.N. Sur. ..... S. D. 220 ft.
Independent Operators' No. 1 Whitehead, SE SE Sec. 10, Blk. 4, I.&G.N. Sur., elev. 1,175 ft. ..... S.D. 5,340 ft.
O. O. Owens' No. 1 Mills, Sec. 126, Blk. 1, I.&G.N. Sur., elev 2,130 ft. ..... S.D. 6,730 ft.

WARD COUNTY

Abell Bros. et al's No. 1 Smith, 330 ft. from NE and NW, Sec. 4, Blk. 34, H.&T.C. Sur. ..... Drlg. 1,755 ft.
Abell Bros.' No. 2 Smith, 2,310 ft. from SE and 2,030 ft. from NE, Sec. 4, Blk. 34, H.&T.C. Sur. ..... Cellar.
Abell Bros.' No. 3 Smith, 2,310 ft. from NE and NW, Sec. 4 ..... Rigged up machine.
Bradford & Bentley's No. 1 B. Carson, 1,650 ft. from the NE line and 990 ft. from the SE line of Sec. 26, H.&T.C. Sur., Blk. ..... T.D. 860 ft.
Eastland Oil Co.'s No. 1 Green, 2,364 ft. from NW and 2,310 ft. from SW Sec. 4, Blk. 34, H.&T.C. Sur. ..... Location.
Eastland Oil Co.'s No. 1 Weiss, 2,365 ft. from SE and SW, Sec. 4, Blk. 34, H.&T.C. Sur. ..... T.D. 2,361 ft.; flowing 18 bbls. per hr.; to deepen.
Eastland Oil Co.'s No. 2 Weiss, 1,725 ft. from SW and 2,365 ft. from SE, Sec. 4, Blk. 34, H.&T.C. Sur. ..... Location.
Eppenauer's No. 1 Purcell, 365 ft. from SW and 1,650 ft. from SE of Sec. 17, Blk. 14, H.&T.C. Sur. ..... T.D. 2,740 ft.
Eppenauer Drlg. Co.'s No. 1 Townsend-Moore, 990 ft. from SE and 330 ft. from SW, Sec. 17, Blk. 34, H.&T.C. Sur. ..... Spudded and S.D.
H. V. Greer's No. 1 Carr, 150 ft. from NW and 510 ft. from SW, Sec. 12, Blk. 8, H.&T.C. Sur. ..... S.D. 2,145 ft.; running casing.
Gulf Prod. Co.'s No. 11 Hutchings, 330 ft. from N and 990 ft. from W of 370 acres in S half Sec. 5, Blk. F .. Drlg. 2,090 ft.
Gulf Production Co.'s No. 22 O'Brien, 1,100 ft. from N and 330 ft. from E, Sec. 16, Blk. F, G.M.M.B.&A. Sur. ..... Rig.
Leydecker et al's No. 1 Bennett, 2,310 ft. from NW and NE, Sec. 16, Blk. 34, H.&T.C. Sur. ..... Drlg. 2,025 ft.
Massie et al's No. 1 Stewart, 330 ft. from SW and SE, Sec. 12, Blk. 14, H.&T.C. Cur. ..... S.D. 2,445 ft.; flowing 18 bbls. per day.
Moran & Burkhart's No. 2 J. T. Sweatt et al, 2,310 ft. from SW, Sec. 1, J. Howe Sur. ..... S.D. 2,000 ft.
Moran & Miles' No. 1 Boogher, 2,603 ft. from NE and 1,303 ft. from SE, Sec. 11, Blk. 5, H.&T.C. Sur. ..... T.P. 2,192 ft.; T.D. 2,322 ft.; fishing tubing.
R. F. Owen's No. 1 Lee, 1,344 ft. from NW and 4,532 ft. from SW, Sec. 1, J. Howe Sur. ..... T.D. 1,760 ft.; underreaming 6⅝-in. csg.
Plains Prod. Co. and Simms Oil Co.'s No. 1 Benton Land Co., 440 ft. from the SE and 440 ft. from SW lines of Sec. 16, W.&N.W.R.R. Sur., Blk. 1 ..... Drlg. 1,470 ft.
Rector Oil Co.'s No. 1 Smith, 1,320 ft. from N and E, Sec. 22, Blk. A, G.M.M.B.&A. Sur. ..... S.D. 3,602 ft.
Renaud-Prettyman's No. 1 University, 330 ft. from N and E Sec. 4, Blk. 16 ..... S.D. 400 ft.
Richardson et al's No. 3 O'Brien, 1,372 ft. from N. 330 ft. from W, Sec. 5, Blk. F ..... T.D. 2,765 ft.; cleaned out; flowing 115 bbls.
Richardson et al's No. 9 O'Brien, 1,112 ft. from N and 990 ft. from W Sec. 5, Blk. F ..... Drlg. 2,590 ft.
Rixford et al's No. 1 Green, 330 ft. from NW and SW Sec. 4, Blk. 34, H.&T.C. Sur. ..... Drlg. 2,425 ft.
Sturm-Simms Oil & Gas Co.'s No. 2 Jones, 1,650 ft. from NE and 330 ft. from SE, Sec. 25, Blk. B-29, P.S.L. .. Drlg. 1,840 ft.
Thomas et al's No. 1 Bennett, 2,310 ft. from NE and SE, Sec. 16, Blk. 34, H.&T.C. Sur. ..... Fishing 475 ft.
White et al's No. 1 Burtner, 150 ft. from NE and 515 ft. from SE of Sec. 8, Blk. 32, H.&T.C. Sur. ..... S.D. 755 ft.

WINKLER COUNTY

Adams et al's No. 1 Scarborough, 660 ft. from N and E Sec. 1, Blk. 77, P.S.L. ..... T.P. 2,820 ft.; S.D. 2,881 ft.; flowing 30 bbls. day.

WILDCAT OPERATIONS IN TEXAS PANHANDLE

Week Ending June 6

BRISCOE COUNTY

Company, well, farm name, section and block— Remarks:
Humble O. & R. Co.'s No. 1 C. Adair est., 2,500 ft. from N line, 2,100 ft. from E line, Sec. 7, Blk. G-5 ..... Coring 3,915 ft.

CARSON COUNTY

Danciger's No. 4 Byrum, 330 ft. from N and E, Sec. 184, Blk. 3, L&G.N. Sur. ..... Cellar.
H. A. M. Oil Co.'s No. 2 Cooper, 330 ft. from S and E, Sec. 5, Blk. 9, I.&G.N. Sur. ..... Location.
Pulse-Shell Pet. Corp.'s No. 1 Byrum, 330 ft. from N and W, W½ NE, Sec. 183, Blk. 3, I.&G.N. Sur. ..... Drlg. 2,835 ft.
Skelly Oil Co.'s No. 10 E. Schaffer, 440 ft. from S. 2,640 ft. from E of N half, Sec. 158, Blk. 3, I.&G.N. Sur. .... T.D. 2,536 ft.; standardizing.
Skelly Oil Co.'s No. 18 West Schaffer, Blk. 4, Sec. 87, I.&G.N. Sur. ..... Cellar.
Skelly Oil Co.'s No. 17 West Schaffer, 1,320 ft. from S, 440 ft. from E, Sec. 87, Blk. 4, I.&G.N. Sur. ..... First oil 3,054 ft.; estm. 20 bbls. daily; T.D. 3,074 ft.
The Texas Co.'s No. 1-C Garner, 990 ft. from N and E, NW, Sec. 94, Blk. 4, I.&G.N. Sur. ..... Drlg. 1,200 ft.
Texoma Nat. Gas Co.'s No. 1-T Jordan, 1,322 ft. from S, 1,324 ft. from E, Sec. 33, Blk. 4, I.&G.N. Sur. ..... Drlg. 1,925 ft.

COLLINGSWORTH COUNTY

Dixon et al's No. 1 Bell, 330 ft. N, 1,320 ft. W, Sec. 102, Blk. 21, H.&G.N. Sur. ..... S.D. 2,503 ft.
Downey et al's No. 1 Beasley, SE cor. SW SE, Sec. 95, Blk. 15, H.&G.N. Sur. ..... Rigged up.

DEAF SMITH COUNTY

Western Union Oil Co.'s No. 1 Farwell, C NW, Sec. 15-3n-2e ..... S.D. 275 ft.

GRAY COUNTY

Back & Barber's No. 1 Back, 660 ft. from S, 330 ft. from W, Sec. 140, Blk. 25, H.&G.N. Sur. ..... S.D. 2,433 ft.
Boyes et al's No. 1 Colebank-Morse, 330 ft. NE, Sec. 66, Blk. 25, H.&G.N. Sur. ..... S.D. 1,650 ft.
Brown et al's No. 1 Duncan, 330 ft. S and E, NW, Sec. 93, Blk. 3, L&G.N. Sur. ..... S.D. 3,544 ft.; 1,200 ft. water in hole.
Continental Oil Co.'s No. 1-A Wright, 330 ft. from S and E of E½ NW, Sec. 13, Blk. 3, I.&G.N. Sur. .... Cmtd. 8-in. at 2,705 ft.
Danciger O. & R. Co.'s No. 9 Powell-Beck, 330 ft. from N, 1,605 ft. from W, Sec. 28, Blk. B-2, H.&G.N. Sur... Drlg. 2,200 ft.
Danciger O. & R. Co.'s No. 3 William, 150 ft. N, 990 ft. from W S half NW, Sec. 7, Blk. 1, A.C.H.&R. Sur.... T.D. 2,590 ft.; standardizing.
Elbar Corp.'s No. 1 Sethinga, 330 ft. from S and E, Sec. 13, Blk. A-9, H.&G.N. Sur. ..... Drlg. 100 ft.
Foster's No. 1 Webb, 350 ft. from S and W, Sec. 43, Blk. 25, H.&G.N. Sur. ..... Drlg. 2,440 ft.
Graham et al's No. 1 Barrett, 990 ft. from N, 330 ft. from E, Sec. 112, Blk. 3, I.&G.N. Sur. ..... Drlg. 3,150 ft.
Granite Prod. Co.'s No. 1 Chapman, 275 ft. from N line, 110 ft. from W line, S½ SW, Sec. of Blk. 26, H. &G.N. Sur. ..... Drlg. 2,800 ft.
Gulf Prod. Co.'s No. 3 Faulkner, 330 ft. from N and E, Sec. 33, Blk. B-2 ..... Drlg. deeper from 2,884 ft.
Jean Pet. Co.'s No. 1 Furneaux Bros., 330 ft. N and W, cor. SE, Sec. 300, Blk. 3-B, H.&G.N. Sur. ..... S.D. 3,075 ft.
Jewel Oil Co.'s No. 1 Meera, 330 ft. from S and W, NW SW, Sec. 106, Blk. 3, I.&G.N. Sur. ..... Fishing 3,325 ft.
Masda-Shell's No. 2 Worley Reynolds, 660 ft. from S and E of NE, Sec. 35, Blk. 3, I.&G.N. Sur. ..... Drlg. 575 ft.
Mid-Kansas O. & G. Co.'s No. 1 Webb, 990 ft. from N, 330 ft. from W, NE Sec. 61, Blk. 25, H.&G.N. Sur. .. T.D. 2,505 ft.; T.P. 2,455 ft.; shot 100 qts. 2,458-95 ft.; flowed 166 bbls. in 12 hours.
Nipper et al's No. 1 Morse, 330 ft. from N and E, Sec. 1, Blk. 26, I.&G.N. Sur. ..... Fishing 2,635 ft.
Nabob Oil Co.'s No. 1-E Morse, 330 ft. from S and W, W½ SE, Sec. 67, Blk. 25, H.&G.N. Sur. ..... Fishing 1,420 ft.
Operators Royalty & Prod. Co.'s No. 2 Arnold, 330 ft. from S and W, Sec. 149, Blk. 3, I.&G.N. Sur. ..... Rig.
Parton & Holt's No. 2 Morse, 330 ft. from W, 250 ft. from N, W½ SW, Sec. 5, Blk. 26, H.&G.N. Sur. ..... S.D. 1,355 ft.
Pulse-Shell Pet. Corp.'s No. 1 Culler, 330 ft. from S and E, Sec. 173, Blk. 3, I.&G.N. Sur. ..... Driving 12-in. csg. 825 ft.
Pulse-Shell's No. 1 Brown, 990 ft. from N, 250 ft. from E of NW, Sec. 128, Blk. 3, I.&G.N. Sur. ..... Rig.
Saulsbury et al's No. 1 Davidson, 330 ft. from S and W, Sec. 87, Blk. B-2, H.&G.N. Sur. ..... Drlg. 2,175 ft.
Saunders et al's No. 2 Sullivan, 523 ft. from W, 231 ft. from NE, 160 ft. S, 264 ac. of N½, Sec. 136, Blk. 3, I.&G.N. Sur. ..... Will plug back to 3,275 ft. and shoot.
Skelly Oil Co.'s No. 9 East Schaffer, 1,320 ft. from S, 440 ft. of N½, Sec. 189, Blk. 3, I.&G.N. Sur. ..... T.P. 3,210 ft.; shot 160 qts. 3,205-65 ft.; cleaning out.
Tarber's No. 1 Saunders, 330 ft. N and W, Sec. 3, Blk. 1, B.B.&S.F. Sur. ..... Location.
Tedesco Oil Co.'s No. 2 Morse, 330 ft. from N and E of NE SW, Sec. 1, Blk. 26, H.&G.N. Sur. ..... Drlg. 640 ft.
The Texas Co.'s No. 4 Davis (old well drilled deeper), Blk. 1, Sec. 3, A.C.H.&B. Sur. ..... Cellar.
The Texas Co.'s No. 9 Williams, 150 ft. from S, 990 ft. from N half NW, Sec. 7, Blk. 1, A.C.H.&B. ..... T.D. 2,590 ft.; standardizing.
The Texas Co.'s No. 10 Cook-Faulkner, 330 ft. from S, 1,665 ft. from W, Sec. 29, Blk. B-2, H.&G.N. Sur..... Drlg. 2,340 ft.
Travis' No. 3 Back, 330 ft. from S, 2,300 ft. from E, Sec. 44, Blk. 25, H.&G.N. Sur. ..... S.D. 2,955 ft.
Travis et al's No. 2-B Webb, 990 ft. from S, 330 ft. from E of NW, Sec. 61, Blk. 25, H.&G.N. Sur. ..... Location.
Weltzel Oil Co.'s No. 3 Morse, 330 ft. from S and E of N half NW, Sec. 67, Blk. 25, A.&G.N. Sur. ..... Rigging up standard tools.

HEMPHILL COUNTY

Hoover's No. 1 Hoover, 350 ft. from N, 1,200 ft. from E, G. S. Hood Sur. ..... To deepen old well; T.D. 5,055 ft.; rigging up.

HUTCHINSON COUNTY

Baso's No. 1 Moore, 330 ft. from S, 350 ft. from E, in 80 ac. in NW, Sec. 21, Blk. M-21, T.C.R.R. Sur. ..... T.D. 3,030 ft.; shot 100 qts. 3,024-64 ft.; testing.
Combination O. & G. Co. and Alspaugh's No. 1 Johnson, 330 ft. from S line, 330 ft. from E line, NW SW, Sec. 4, Blk. Y, A.&B. Sur. ..... Set 6-in. csg. 2,993 ft.; show oil 2,940 ft.
Danciger O. & R. Co.'s No. 1 Johnson, 330 ft. N and W, SE, Sec. 34, Blk. Y, A.&B. Sur. ..... Spudded and S.D.
Deal O. & G. Co.'s No. 2 Sanford, 330 ft. N and E of N 80 ac., S 160 ac., Sec. 81, Blk. 46, H.&T.C. Sur. ... S.D. 450 ft.
Holmes & Newblock's No. 2 Moore-Langdon, 330 ft. from N and W, Sec. 135, Blk. 4, I.&G.N. Sur. ..... Drlg. 500 ft.
Huber Pet. Co.'s No. 1-A Weatherly, 330 ft. from N and W, Sec. 36, Blk. Y, A.&B. Sur. ..... Drlg. 2,370 ft.; show gas 2,270-80 ft.
Liner Drlg. Co.'s No. 1-D Johnson, 330 ft. from N and E, Sec. 6, Blk. 1, B.&B. Sur. ..... Plugged back to 3,146 ft.; S.D.
Oates & Morrow's No. 2 Starnes, 1,400 ft. from S, 650 ft. from E, Sec. 34, Blk. M-23, T.C.R.R. Sur. ..... Rig.
Pharis Oil Co.'s No. 5 Smith, 660 ft. from N and W, SW, Sec. 14, Blk. Y, M.&C. Sur. ..... Spudded.
Timms-Deatch's No. 4 Moore, 330 ft. N and W, Sec. 124, Blk. 4, I.&G.N. Sur. ..... Rig.

LIPSCOMB COUNTY

Okla. Public Service Co.'s No. 1 C. W. Jones, NE SW, Sec. 100, H.&T.C. Sur. ..... T.D. 5,003 ft.

MOORE COUNTY

Dogie Oil Co.'s No. 1 Greenwald, 330 ft. from N and W, Sec. 377, Blk. 44, H.&T.C. Sur. ..... S.D. 205 ft.
Dana O. & G. Co.'s No. 1 Robertson et al, 330 ft. from S and E, Sec. 165, Blk. 3-T, T.&N.O. Sur. ..... Cellar.
Interstate's No. 1 Nield, C NE, Sec. 18, Blk. 44, H.&T. C. Sur. ..... Rig up.
Magnolia Pet. Co.'s No. 1 Nield, 330 ft. from S and E, N½, Sec. 361, Blk. 44, H.&T.C. Sur. ..... T.D. 3,646 ft.; S.D.
Pollard et al's No. 1 Hall, 330 ft. S and E, NE, Sec. 131, Blk. 3-T, T.&N.O. Sur. ..... Rig on ground.
Sunray Oil Co.'s No. 2 Jones, 330 ft. N and W, W½ SW, Sec. 164, Blk. 3-T, T.&N.O. Sur. ..... Rig on ground.
Sunset Oil Co.'s No. 1 Dora, 330 ft. from N and W, W½, Sec. 318, Blk. 44, H.&T.C. Sur. ..... Plugged back for gas.

MOTLEY COUNTY

Matador Oil Corp.'s No 1 Owens, C NE, Sec. 10, Blk. G, B.&B. Sur. ..... S.D. 530 ft.

OLDHAM COUNTY

Amalgamated German-American Oil Corp.'s No. 1 Norton, 330 ft. S and E, Sec. 13, T.&N.O. Sur. ..... S.D. 400 ft.
Chambers et al's No. 1 Herring, CNL, Sec. 30, Blk. 8, G.C.&S.F. Sur. ..... S.D. 3,711 ft.

PARMER COUNTY

Magnolia Pet. Co.'s No. 1 Wilson, 330 ft. from N and W, SE, Sec. 73, H. Kelly Sur. ..... Coring 5,210 ft.

POTTER COUNTY

Red River Gas Co.'s No. 7-A Rivina, center SW, Sec. 35, Blk. M-20, G.&M. Sur. ..... Drlg. 2,550 ft.; 21,000,000 ft. gas at 2,540 ft.

ROBERTS COUNTY

Chicken Creek Oil Co.'s No. 1 Ledrick, 330 ft. N and W, Sec. 55, Blk. C, G.&M. Sur. ..... Drlg. 4,975 ft.
Travis et al's No. 1 Cunningham, 330 ft. S and W, Sec. 74, Blk. M-2, H.&G.N. Sur. ..... S.D. 2,690 ft.

WHEELER COUNTY

Devore & Robinson's No. 1 Sitter, 2,310 ft. from S and E, E½, Sec. 33, Blk. 24, H.&G.N. Sur. ..... S.D. 2,559 ft.; 15,000,000 ft. gas.

Another Good Well in Western Osage

Bay Oil Co. Wildcat Near Naval Reserve Extends Hominy Sand Production. Serious Floods in Oklahoma City

By W. A. Spinney
Staff Correspondent, Oklahoma Fields

Notwithstanding heavy rains which flooded a part of the Oklahoma City and Greater Seminole Fields in the latter days of the past week, production of the State increased about 9,000 bbls. a day in the week ending June 4. The high water interfered with operations in the two big areas, especially in a part of the Oklahoma City Field, and had it not been for the floods the takings of oil might have been further increased.

During the week the second well was completed near the naval reserve in western Osage County. Bay Oil Co.'s No. 1, in the NW cor. NE NW, Section 13-23-7, flowed at the rate of 120 bbls. the first hour and was then shut in. The oil came from the Hominy sand at 2,828-32 feet. The well was shut down to erect tankage and secure a pipe line connection. It is approximately 3½ miles from the nearest production and is nearly 6 miles south of the Producers & Refiners Corp. and Peters Petroleum Corp.'s recent completion in SE cor. NW NE, Section 24-24-7, which found production in the Silicious lime.

Champlin Refining Co. has a rig up in the NE cor. NW SE, Section 24-24-7, about a half mile south of the Producers & Refiners Corp.'s well.

Producers & Refiners Corp. and Peters Petroleum Corp.'s No. 1 in Section 24-24-7, which flowed at the rate of 168 bbls. an hour from the Silicious lime at 2,768-96 feet, was drilled 1 foot during the past week and was flowing 7 bbls. of oil an hour.

Pure Oil Co.'s No. 1 Unglesby-Pinkston in approximately SE cor NW, Section 1-15-6, Lincoln County, on a narrow strip of acreage, which was originally completed as a gas well, in Wilcox sand at 3,648-55 feet, and later drilled deeper to 3,705 feet, where it made 270 bbls. of oil, is shut down waiting for casing to be cemented at approximately 3,700 feet. A location west of the Pure Oil Co.'s well, the Gypsy Oil Co.'s No. 1 Pinkston, in Section 1-15-6, was also drilled deeper into the Wilcox sand, at 3,650-98 feet, where it was making 14 bbls. of oil an hour and is shut down awaiting a pipe line connection.

Stanolind Oil & Gas Co.'s No. 1 in the NE cor. SW, Section 1-15-6, was rigging up to drill deeper from 3,660 feet.

The new extension area to the south of the St. Louis Pool, in Pottawatomie County, will soon have three additional wells. Amerada Petroleum Corp.'s No. 1 Mitchell, NE cor., Section 3-6-4, found oil in the Simpson at 4,267-70 feet, where it made 120 bbls. in 20 minutes, and 225 bbls. in six hours and then went dead. The bailer was then run into the hole and found 1,000 feet of fluid in the hole, part of which was water. Pure Oil Co.'s No. 1 Tucker, SE cor., Section 34-7-4, was drilling in the Simpson at 4,228 feet. It was swabbing around 60 bbls. of oil a day from the Viola lime. Noble Drilling Co. and others' No. 1 Lucus, NW cor., Section 2-6-4, was drilling at 3,800 feet. The top of the Mayes lime was found at 3,640 feet, which is believed to be higher on structure than the discovery well.

The discovery well in the area is Carter Oil Co. and others' No. 1 Monett, SW cor., Section 35-7-4, which was making around 417 bbls. of oil and 15 bbls. of water a day on air and gas lift.

A shallow pool is being developed about 4 miles northwest of Woodville, Marshall County, near the Red River in southern Oklahoma. Two wells have been completed in the area, the discovery well being estimated at 10 bbls. a day and the second well at 25 bbls. a day from a sand around 800 feet deep. As the result of these two wells there are now 10 tests drilling and three machines are rigging up.

The discovery well was J. Liggett and others' No. 1 McDuffy, NW cor. SE NE SW Section 3-7s-6, and was originally drilled to a total depth of 1,101 feet, where it was dry. The operators plugged it back to 823 feet to test a sand at 791-823 feet, where it was completed for 10 bbls. a day. The same operators drilled the second test in the SE cor. NE SW Section 3-7s-6, and it made 25 bbls. of oil at 790-99 feet and 805-09 feet.

The next well expected to reach the pay horizon is Threlkill-Hoggard and others' No. 1 Spence, NW cor. NE Section 10-7s-6, a half mile south of the discovery well, which cored a sand with a showing of oil at 798 feet.

Collins Petroleum Co.'s No. 1 in Section 10-7s-6 found a showing of gas which cleaned the hole while drilling at 794 feet and it was shut in for an estimated 3,000,000 feet a day.

Nearly every tract of acreage in the areas extending from Kingston to the Red River has been leased. Several new operations are expected to be started in the near future that will either prove this to be a large field or define the present producing limits.

In the other areas of southern Oklahoma, the Tatums Pool has three active operations. E. M. Boring and others' No. 1 Wolfe, SE cor. NE Section 13-1s-3w, is a new location in the Tatums Field in Carter County. T. E. Bradley and others' No. 1 Pruitt, NE cor. SW SE Section 8-1-9w, a wildcat in eastern Comanche County, found a showing of oil in sand at 1,640-45 feet.

A Serious Flood

During the week a storm and flood took huge toll in the Oklahoma City Field and in several spots in the Greater Seminole area. Practically all drilling wells in the Oklahoma City Field were shut down either all or part of Friday, due to the heavy rains washing out the slush pits.

In the extreme northern end of the Oklahoma City Field tanks were floated away from their foundations and derricks were threatened. The flooded area extended in Sections 3 and 10 for nearly 2 miles.

The gas and oil pipe lines in the north of the field were shut down in an area covering around 4 miles. All gates on gathering lines were closed and storage batteries were sealed. This was done to prevent breaks in the lines and allowing the crude oil to get on the flood waters. However, many storage batteries were toppled over, and their contents floated on the water.

Lease houses throughout the field were anchored where it was possible and boilers and pump houses barricaded. The Sterling Refining Co. plant in the north end of the field lost a number of tanks which contained crude oil and refined stocks. The White Oak plant was isolated and forced to shut down by 3 feet of water. The Gulf State Refining Co. plant was also forced to shut down by rising water. Other plants in the north end of the field started drawing on crude oil stocks as pipe lines were inactive.

The Slick-Urschel Classen-Edwards lease in SW Section 3-11-8w, which is flanked by the river on both sides, was under water from 3 to 20 feet Several tanks were seen floating around in the swift current and it was estimated that all the tanks may be lost. Phillips Petroleum Co.'s properties and drilling wells in Sections 3 and 10 suffered considerable damage.

It was estimated that more than 200 producing wells were located in the flood zone and approximately 34 drilling wells or locations with rigs complete that are shut down taking their 58-day shut down time.

In the Greater Seminole area the damage was the greatest in the south end. In the Allen Field there are several producing wells in the Canadian River bed and these were forced to shut down.

Closely Checking Production

State Umpire Ray M. Collins announces that in an attempt to check every barrel of crude oil produced in the Oklahoma City Field, instructions have been issued to all purchasers of oil from trucks to make reports of such transactions to the umpire's office. Truck drivers were notified that they will be obliged to secure permits from the umpire's office before going on a lease to remove the so-called waste oil.

Oil operators were also advised that unreported picked-up oil will be charged against the allowable production of the lease unless permit has been granted for its removal. This method was adopted to prevent what some have termed thefts of oil from slush pits, ponds and streams on the leases. It is believed that much of the oil is wastage, but some express the opinion that part of the oil may have been deliberately spilled into the pits or ponds.

It is believed the oil gathered in the trucks has been delivered to some small refineries. It is said that one refiner has has handled approximately 30,000 bbls. of crude oil in this manner within the last 60 days and another approximately 18,000 bbls. in the same time. It was stated that these amounts were in excess of the running capacity of the plants. Some of the refineries have reported handling most of the crude, but that they do not know the source of the crude.

Recently one of the producing companies reported that two tanks of a battery had been opened during the night and the crude oil permitted to flow into a small ravine nearby. The next day a couple of trucks were picking up the oil and transporting it to a nearby refinery.

Similar reports have been made from time to time, more especially by lease owners along the river and near streams in the field. At times the streams in the field have been covered with a thick body of oil, but by the use of pumps the oil has been cleared in a short time.

It is believed to be almost impossible to check all the tank trucks in the field, and Umpire Collins is putting the burden on the operators to watch the tanks and waste oil on their leases. The umpire mailed the following rules to all operators governing this class of oil: "Each producer, before disposing of any tank bottom oil or waste oil, must notify the umpire's office of his intention the day before, giving the location of the tanks and pits. The umpire's office will send a representative to check the amount and the quality of the waste oil intended for disposal. In event that the umpire's representative is unable to be present, the umpire's office will appoint a representative from one of the offset leases. A completed report must be transmitted to the umpire's office.

"Any waste oil transported from the lease pits without having undergone an investigation by the umpire's force or representative will be charged against the lease as production and the same deducted from their allowable."

Underproduced Wells

The underage in the Oklahoma City Field was reduced during the week by the Oklahoma Corporation Commission, on wells which are unable to make their allowable. The 23 wells listed had a combined underproduction of 274,074 bbls. and nine of these wells have been given an additional 30 days in which to get even with the schedules.

A list of the nine wells exempt with their status as of May 23 follows:

Company and well—	Underage
Anderson-Prichard, No. 1 Graham	22,060
Anderson-Prichard, No. 2 Graham	5,886
Wirt Franklin, No. 7 Theimer	42
I. T. I. O., No. 4 Ferndale	581
I. T. I. O., No. 4 Spillman	23,414
I. T. I. O., No. 3 Trosper et al	7,289
I. T. I. O., No. 6 Trosper	19,868
I. T. I. O., No. 7 Trosper	13,337
Scott & Co., No. 1 Ashby	7,118

Wells on which no action has been taken are as follows, with amounts of underproduction:

Company and well—	Underage
I. T. I. O., No. 1 Holmes-Gray	16,938
I. T. I. O., No. 1 Magnolia	7,357
I. T. I. O., No. 1 Mt. Vernon	73
I. T. I. O., No. 1 Reynolds	3,339
I. T. I. O., No. 6 H. G. Trosper	4,106
I. T. I. O., No. 7 H. G. Trosper	14,328
Peacock, No. 1 Shepard	9,903
Slick et al, No. 1 Hoops	33,094
Slick et al, No. 5 Hoops	26,633
Slick et al, No. 1 Husman	28,903
Slick et al, No. 1 Page	6,588
Slick et al, No. 2 Page	17,425
Continental, No. 1 Sudik	2,575
Champlin, No. 1 Seal	4,463

Indian Territory Illuminating Oil Co. has agreed to have the first six wells in the above list stricken off, as to continue production would cause a loss of gas energy.

Umpire Collins will prepare a list of wells in the Oklahoma City Field which should have new potentials taken, and orders will be issued by the Oklahoma Corporation Commission. Many of the older wells in the field have not had potential tests taken since in 1930 and some are making up overproduction or old schedules.

Huge Producers

Two huge producers were tested in the Oklahoma City Field during the week. Grison Oil Co.'s No. 1 Turner, NW cor. SW, Section 34-12-3w, when opened for 3 hours and 22 minutes flowed 12,327 bbls. of oil, and the gas was estimated at 70,000,000 feet a day. The well was shut in on account of sand cutting the connections. On the first-hour gauge the well made 3,659 bbls., increasing to 3,928 bbls. the second hour and dropping to 3,218 bbls. the third hour. The well is producing from the Wilcox sand at a total depth of 6,530 feet with the 9-inch casing landed at 6,330 feet. It also made considerable sand with the oil.

The other well was Phillips Petroleum Co.'s No. 1 Still, SE cor. NW NE, Section 3-11-3w, which flowed 10,390 bbls. of oil in three hours. It was produced through a 5/16-inch choke. The total depth of the well is 6,466 feet in the Wilcox sand with the 9-inch casing landed at 6,282 feet. The well was given its first production test last month and flowed 7,707 bbls. of oil in three hours through a 4-inch choke, and later flowed 4,835 bbls. in 1½ hours through a 4¼-inch choke.

Phillips Petroleum Co.'s No. 1 Roberts, on Block 71 of the Shields Addition in the N half NW NE SW, Section 15-11-3w, and for No. 1 Micks, on Block 72 in the S half NW NE SW, Section 15-11-3w, were new locations announced on the west side of the field.

Phillips Petroleum Co.'s No. 1 August, SW cor. NE, Section 3-11-3w, in the Walnut Grove Addition, flowed 3,228

Figure 2. Worthington No. 4 Three-stage Centrifugal Pump for Gasoline Line Service

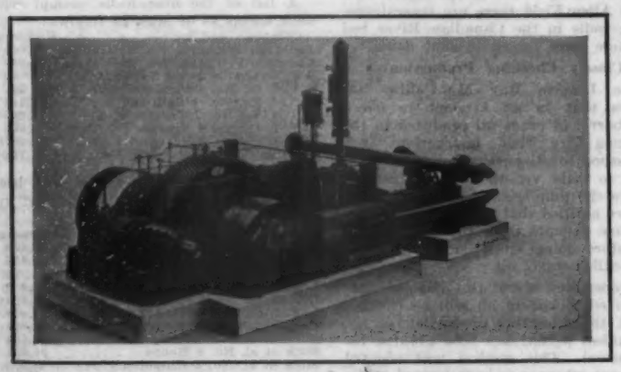

Figure 3. Worthington 6" x 18" Horizontal Triplex Power Pump as furnished for Gulf's Oklahoma-Pennsylvania Oil Line

Figure 4. Two Worthington 17" x 25" Four-cylinder, Four-cycle Diesel Engines driving Oil Line Pumps

Figure 5. Three Worthington Steam-driven Horizontal Duplex Compressors pumping manufactured gas from New Haven, Conn.

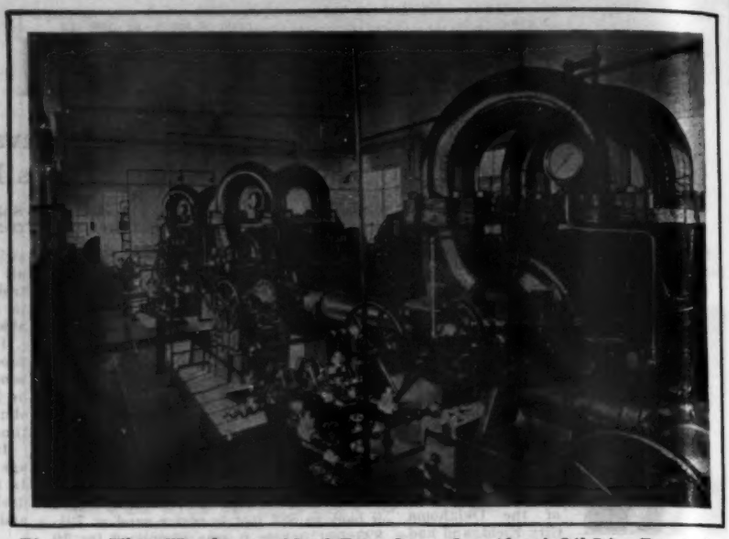

Figure 1. Three Worthington No. 8 Four-Stage Centrifugal Oil Line Pumps in the Cole Camp, Mo., Station, Texas-Empire Pipe Line Company

THE modern demand for rapid and economical distribution has brought into being the great network of oil and gas pipe lines . . . and its indispensable chain of pumping stations, the heart back of the arteries.

Worthington has been called upon to furnish the equipment for so many of those stations that, to characterize adequately the extent of this service, it is necessary to use an unusual but expressive word . . . Ubiquity.

To list the installations of Worthington Pumps, Compressors, Diesel Engines and Gas Engines on pipe line service would be to publish a "Who's Who" of the oil and gas industries. Instead, we show a representative group of photographs illustrating six distinct classes of Worthington products used in operating the lines.

Figure 1 shows the well-known Worthington Centrifugal Pump for crude oil pipe lines. The success of this pump, since its introduction in 1927, has resulted in a steadily increasing number of installations on important lines. Simplicity of design, reliability

Figure 6. Five Worthington 24" x 13" x 36" Twin-tandem Gas Engine Compressors in the Beatrice, Nebraska, Station of the Amarillo-Chicago Natural Gas Line

PROVED

in Pipe Line Service

and high efficiency are the outstanding characteristics responsible for its acceptance. It is built in capacities of 10,000 to 90,000 bbl. per day.

Figure 2 is the Worthington Centrifugal Pump for gasoline pipe lines. It embodies the loop inter-stage passage, internal bearing, single stuffing box and other proven points of the crude oil pump, plus features developed specifically to meet the requirements of gasoline pumping.

Figure 3 is the Worthington Motor-driven Horizontal Power Pump for crude oil pipe lines, furnished in either duplex or triplex type. Its forged steel cylinders are a positive protection against breakage in high pressure oil service. Large bearings, valves accessible from above, and elimination of gaskets on valve hole plugs are among the features that contribute to its good performance.

Figure 4 shows the Worthington Vertical Four-cycle Air-injection Diesel Engine used to drive power pumps in oil pipe line duty. For this class of service, Worthington offers a complete line of Diesels in ranges of power, through various types, from 50 hp. to 12,000 hp.

Figure 5 represents the Worthington Horizontal Duplex Compressor, in wide use for the pumping of manufactured gas. This type of compressor is furnished with either steam or electric motor drive, and brings to the gas industry notable developments in design, including the Feather Valve and the electrically-operated five-step variable-capacity control.

Figure 6 illustrates the Worthington Gas-engine-driven Gas Compressor, used in more than 50% of the natural gas pipe line stations, as exemplified by the first unit of this type, built in 1900 for the Columbia Natural Gas Company, and the 57 units installed on the Amarillo-Chicago Line.

Thus, to pipe line operators, Worthington offers an experience and a range of products that are factors to be considered whenever installations are planned. At the nearest Worthington office you will find engineers qualified to discuss the application of Worthington equipment to *any* pipe line requirement.

PUMPS *All Sizes...All Types* *For All Services* *Any Capacity...Any Pressure*	COMPRESSORS *Stationary and Portable*
CONDENSERS and Auxiliaries	ROCK DRILLS
DIESEL ENGINES	AUTOMATIC HEAT TREATING MACHINES FOR DRILL STEEL
GAS ENGINES	FORGING FURNACES FOR DRILL STEEL
FEEDWATER HEATERS	DRILL STEEL
WATER, OIL and GASOLINE METERS	ACCESSORIES
MULTI-V-DRIVES	CHROMIUM PLATING

Literature on request

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6-9-32

bbls. of oil in two hours through a 4¼-inch choke. The gas was estimated at 40,000,000 feet a day. The total depth of the well is 6,426 feet and the 9-inch casing is cemented at 6,289 feet.

Oklahoma City Production

Production from the Oklahoma City Field during the first few days of the month were as follows: June 1, 42,988 bbls. from 99 wells; June 2, 164,784 bbls. from 162 wells; June 3, 117,609 bbls. from 159 wells; and June 4, 37,200 bbls. from 96 wells.

Beckham County

Mid-Continent Oil & Gas Corp.'s No. 1 Schulff, NW cor. SW, Section 22-11-22w, was abandoned at a total depth of 430 feet.

Carter County

E. M. Boreing's No. 1 Wolfe, SE cor. NE, Section 13-1s-3w, is a rig. Lundy and others' No. 1 Spraggins, C NE NW SW, Section 8-1s-2w, was abandoned at a total depth of 3,283 feet. Schermerhorn-Ardmore Oil Co.'s No. 8 Wilson, S NW NE SE, Section 23-4s-3w, was completed for 45 bbls. of oil from sand at 1,080-1,114 feet.

Creek County

Johnson Oil & Refining Co.'s No. 2 Johnson, NW cor. SW NE, Section 29-19-9, is a location. Willrough Oil Co.'s No. 2 O.U.R., SW cor. NE NW, Section 32-17-12, is a rig. H. Willibey and others' No. 1 Davidson, CNL SE NW, Section 31-19-8, is spudding. Fogle and Marble's No. 1 Wright, NW cor. SE, Section 7-19-8, made 6 bbls. of oil from sand at 2,752-62 feet. A. W. Swift and others' No. 1 Coonrod (twin), SE cor. NW SW, Section 3-19-9, was completed for 650,000 feet of gas at 1,255-1,310 feet. Roy Dean and others' No. 1 Nance, CNL NE SW, Section 30-19-9, was abandoned at a total depth of 2,588 feet. Roy Dean and others' No. 1 Lashley, NW cor., Section 19-19-9, was plugged in Wilcox sand at 3,123-27 feet. Johnson Oil & Refining Co.'s No. 1 Evans, NE cor. SE NW, Section 29-19-9, made 140 bbls. of oil after a 200-quart shot at 2,123-65 feet. Comail Oil Co.'s No. 1 Derrisaw, C SW NE SW, Section 6-17-7, was plugged at a total depth of 2,460 feet. McCurry and others' No. 3 Watkins, NW cor. SE SW, Section 28-17-11, was completed for 120 bbls. after a 120-quart shot in sand at 1,658-86 feet.

Ellis County

L. C. Hivick and others' No. 1 Roper, C SE NW, Section 21-20-24w, is a rig on the ground.

Lincoln County

Gypsy Oil Co.'s No. 1 Rich, SE cor. NE, Section 1-15-6, old well drilled deeper, found oil at 3,665-98 feet, and made 227 bbls. in 42 hours.

Marshall County

Jones Brothers' No. 1 Flint, SW cor. NW NW SE, Section 3-7s-6, is a machine. L. W. Little's No. 1 McDuffy, SE cor. NW NW SW, Section 3-7s-6, was spudding. Collins and others' No. 1 Lewis, SE cor. NE SE NE, Section 4-7s-6, was spudding. Curry and others' No. 1 Croft, NE cor. NW SW SW, Section 9-7s-6, was plugged at 857 feet. Joe Taylor's No. 1 Arbuckle, SW cor. SE, Section 25-5s-5, was abandoned at 185 feet.

Muskogee County

G. S. Wilson and others' No. 5 Barnett, NW cor. SW, Section 35-16-15, made 15,000,000 feet of gas from sand at 1,078-91 feet. J. M. Foltz and others' No. 1 Patterson, SE cor. SW NW, Section 8-15-18, was completed for 20 bbls. of oil from the pay at 1,611-16 feet.

Osage County

Producers & Refiners Corp. and Peters Petroleum Corp.'s No. 1 well, C SE NW NE, Section 24-24-7, made 173 bbls. of oil an hour from the Silicious lime at 2,768-93 feet. Lewis Production Co.'s No. 1 well, NE cor. SE, Section 28-24-7, is a rig. R. S. Duffield's No. 1 well, SE cor. SW, Section 28-22-12, was plugged after finding water at 1,332-68 feet.

Okmulgee County

Wigton-Long and Mack Drilling Co.'s No. 1 Daniel, NE cor. SE SE, Section 25-13-12, was abandoned in Wilcox sand at 2,89[illegible]2,918 feet.

Oklahoma County

Phillips Petroleum Co.'s No. 1 Fish, SW cor. NE SW, Section 15-11-3w, is a cellar. Same company's No. 1 Micks, NW cor. NE SW, Section 15-11-3w, is a cellar. Same company's No. 1 Neff, NE cor. SE SW, Section 15-11-3w, is a rig. Same company's No. 1 Roberts, CNL NE SW, Section 15-11-3w, is a cellar. Same company's No. 1 Dobson, NE cor. NW SE, Section 22-11-3w, is a cellar. Same company's No. 1 Drew, SE cor. NW SE, Section 22-11-3w, is a cellar. Same company's No. 1 Hunter, CWL NW SE, Section 22-11-3w, is a rig. Same company's No. 1 Nellie, in Block 23, Section 3-11-3w, made 6,536 bbls. of oil in 5⅔ hours, from Wilcox sand at 6,256-6,358 feet. Same company's No. 1 Garver, SE cor. NW NE, Section 22-11-3w, made 210 bbls. of oil in 4½ hours, from Wilcox sand at 6,483-6,510 feet.

Pawnee County

P. Adamson and others' No. 2 McFall, CNL NE SE, Section 4-20-8, was spudding. Oklahoma Power & Water Co.'s No. 134, in the NE cor. NW SE, Section 29-20-10, was abandoned at 2,165-68 feet. Doc Young and others' No. 1 Purcell, C NE NW, Section 34-21-8, made 15 bbls. of oil after a 120-quart shot in sand at 1,694-1,721 feet.

Pontotoc County

Stanolind Oil & Gas Co.'s No. 4 Roper, NE cor. SE NW, Section 32-5-5, is a cellar. Sunray Oil Co.'s No. 1 Grant, C SE NE, Section 11-4-8, is a location. Edna Marie Oil Co.'s No. 1 McWhirt, NE cor. SE, Section 11-2-6, is a location. Pioneer Oil Co. and McCoy's No. 1 Bayne, SE cor. SW SW, Section 16-5-6, made 96 bbls. of oil from sand at 1,674-86 feet.

Pottawatomie County

Papoose Oil Co.'s No. 1 Hern, NW cor., Section 24-6-3, was spudding. Barnsdall Oil Co. and others' No. 1 Gray, NE cor. SW, Section 25-6-4, made 1,473 bbls. of oil from the pay at 3,484-90 feet.

Seminole County

Amerada Petroleum Corp. and others' No. 3 Chase, SW cor. NW SE, Section 29-9-6, is a rig. Empire Oil & Refining Co.'s No. 5 Brown, SW cor. NE SE, Section 3-8-5, made 245 bbls. after a 60-quart shot in sand at 4,166-83 feet. Same company's No. 4 Fish, SW cor. NE SE, Section 19-7-8, was completed for 2,572 bbls. from the pay at 3,044-3,116 feet. Empire Oil & Refining Co. and others' No. 3 Fish, SE cor., Section 19-7-8, was completed for 56 bbls. of oil and 26 bbls. of water after plugging back from a total depth of 3,215 feet, to the pay at 3,066-88 feet.

Stephens County

Chambers and others' No. 4 Dare, CNL NE SE, Section 2-2s-8w, is a machine. Pace and others' No. 4 Pitts, NE cor. SE, Section 3-2s-8w, is a rig. Same operators' No. 2 Bristow, NW cor. NE SE SE, Section 18-2s-7w, is a rig. Same operators' No. 10 Watkins, NE cor. SE SE, Section 21-2s-7w, was plugged at 1,745 feet. Same operators' No. 11 Watkins, SE cor. NE SE, Section 21-2s-7w, made 175 bbls. of oil from the pay at 1,725-30 feet. Same operators' No. 12 Watkins, NE cor. SE NE SE, Section 21-2s-7w, is spudding. Chambers and others' No. 3 Dare, NE cor. NW SE, Section 2-2s-8w, made 3,000,000 feet of gas from the sand at 1,510-35 feet.

Tulsa County

Lambert and others' No. 1 McIntosh, NE cor. SE SW, Section 9-19-14, was drilling at 1,400 feet. Owens and others' No. 2 Bruner, CNL SW SW, Section 13-19-13, made 3 bbls. of oil from the pay at 1,001-20 feet.

Wagoner County

J. E. Martin and others' No. 1 Drew, CNL NE SW, Section 26-18-15, is a rig. Sewell and others' No. 2 Haynie, CSL NW SE, Section 13-17-15, was drilling at 1,000 feet. Hartman and others' No. 2 Sarty, SE cor. NW, Section 7-17-16, was spudding. Brannan Oil Co.'s No. 1 Gregory, SE cor. NE NW, Section 19-17-17, was drilling at 1,000 feet. Metzgar and Foltz's No. 4 Wilson, CNL SW NW, Section 30-17-17, was drilling at 500 feet.

Noble County

Sinclair Prairie Oil Co.'s No. 2 Waltermire, NW cor. SW SE, Section 33-21-1w, is a rig.

WILDCAT OPERATIONS IN OKLAHOMA

NORTHERN OKLAHOMA

ALFALFA COUNTY

Company, farm and location— Remarks:

Smith Brothers' No. 1 Forbes, SE cor. NW NW Sec. 12-27-11w ..... S.D. 1,232 ft.

J. W. Bailey's No. 1 Acre, SW cor. NE Sec. 14-24-11w.. S.D. 5,503 ft.

BECKHAM COUNTY

Pattel Royalty's No. 1 Goose Tree, SW SE SW SE Sec. 32-10-23w ..... Rig.

Price-McFann's No. 1 Webster, C SW SW Sec. 34-8-26w.. T.D. 2,344 ft.; plugged back to 1,890-1,900 ft.; 1,500,000 ft. gas.

Mid-Continent's No. 1 Schaff, C NE SW Sec. 32-11-23w.. Waiting on cmt. to set 430 ft.

Mid-Texas Co.'s No. 1 Sidell, NE cor. SW SW Sec. 17-22-22w ..... S.D. 2,550 ft.

White et al's No. 1 Green, SW cor. Sec. 24-10-24w ..... S.D. 3,575 ft.

BLAINE COUNTY

Washoma Oil Co. et al's No. 1 Phillips, C NW SW Sec. 13-19-10w ..... S.D. 5,115 ft.

CADDO COUNTY

Abernathy & Brown's No. 2 Houston, Sec. 24-6-13w ..... S.D. 1,115 ft.

CHEROKEE COUNTY

La Piere et al's No. 1 Woods, C SE SE Sec. 27-17-21 .... S.D. 1,504 ft.

COAL COUNTY

Radial Oil Co.'s No. 1 McGraw, NE NW Sec. 2-1s-5 ..... S.D. 1,450 ft.

COMANCHE COUNTY

T. E. Bradley et al's No. 1 Pruitt, NE SW SE Sec. 8-1-9w. Drlg. 1,538 ft.

G. W. Stogner's No. 1 Doebel, C SW SW Sec. 3-3-9w..... S.D. 1,450 ft.

CREEK COUNTY

E. L. Jillson et al's No. 1 Starr, SE NW, Sec. 18-15-8 .... Rig.

CUSTER COUNTY

Miley Pet. Co.'s No. 1 Caldwell, NE Sec. 13-14-14w ..... Location.

GRADY COUNTY

English Drlg. Co.'s No. 1 Heenan-Coe, NE SE NE, Sec. 32-3-7w ..... Spudded.

Carter Oil Co.'s No. 1 Carson, C SE SE, Sec. 12-3-8w. Drlg. 4,100 ft.

Schoonmaker et al's No. 1 Station, NW cor. 35-4-6w.... Drlg. 40 ft.

GARFIELD COUNTY

E. L. Love et al's No. 1 White, SE cor. NW Sec. 9-24-6w.. S.D. 5,850 ft.

GREER COUNTY

Dovell et al's No. 1 Capell, NW cor. Sec. 1-7-22w..... 5,000,000 ft. gas 1,455-65 ft.; T.D. 1,760 ft.

Frezch's No. 1 Murphy, SW NW Sec. 23-7-21w..... S.D. 1,645 ft.

HASKELL COUNTY

Ault et al's No. 1 Hall, NW SW SW Sec. 14-9-19 ..... S.D. 2,000 ft.

Ault et al's No. 1 Hall, SE NW Sec. 25-19-9 ..... S.D. 200 ft.

KAY COUNTY

Bluebaugh et al's No. 1 Indian, C NW NE Sec. 30-25-1... Drlg. 2,305 ft.

Lewis et al's No. 1 Harris, SE NW Sec. 14-35-1 ..... Location.

Mummert Drlg. Co. et al's No. 1 Cormick, C NW SE Sec. 9-27-2 ..... S.D. 3,693 ft.

Blackwell Oil Co.'s No. 1 Harshman, Sec. 2-26-1w ..... Rig on ground.

KIOWA COUNTY

Christian's No. 1 Jones, NE SE Sec. 8-7-18w..... C.O. 1,200 ft.

LATIMER COUNTY

P. English's No. 1 Unknown, NW SE Sec. 16-6-19 ..... S.D. 1,542 ft.

LINCOLN COUNTY

Sovereign Oil's No. 1 Selakek, NE SE Sec. 2-12-5 ..... Wilcox 4,563-71 ft.; water; P.B.

Hilton Phillips' No. 1 Phillips, SW NW Sec. 2-14-3 ..... Show oil and water; 6-in. csg.. swabbing; T.D. 5,080 ft., water. P.B.

Mote et al's No. 1 School Land, NW cor. Sec. 36-17-5 ... S.D. 3,570 ft.

NOBLE COUNTY

Wentz Oil's No. 1 Wolff, C SE NW Sec. 17-20-2w..... Rig.

OKLAHOMA COUNTY

Citizens Oil Co.'s No. 1 Sage Barber, NE cor. Sec. 21-11-3w ..... S.D. 1,200 ft.

L. C. Hivick's No. 1 Sunset Addition, NW SW NW Sec. 17-11-3w ..... S.D. 5,515 ft.

PAWNEE COUNTY

Rookstool's No. 1 Wylie, NW NE SW Sec. 6-20-5 ..... S.D. 1,950 ft.

PITTSBURG COUNTY

Ruby Ann Oil Co.'s No. 1 George, CEL NW SE Sec. 3-4-16 ..... Show gas 1,116-37 ft.; T.D. 1,282 ft.; to test.

Tape Oil Co.'s No. 1 Fulton, SE Sec. 34-7-14 ..... Drlg. 2,003 ft.

J. Morrison's No. 1 Fowler, NE SE Sec. 13-7-17 ..... Rig.

C. Kennedy's No. 1 Travis, C SW NE Sec. 15-7-14 ..... Rig.

Moffett & Hall's No. 1 Jones, NW cor. Sec. 14-5-14 ... Spudding.

PONTOTOC COUNTY

Vanderslice's No. 1 Meredith, NE SW, Sec. 17-2-4 ..... S.D. 230 ft.

POTTAWATOMIE COUNTY

Ciara Oil & Gas Co.'s No. 1 Unknown, SW NW NE, Sec. 1-9-4 ..... Wilcox 4,536-56 ft.; water; to abnd.

Barnsdall et al's No. 1 Gray, NE SW Sec. 25-6-4 ..... Flowed 1,473 bbls. 3,484-90 ft.

ROGER MILLS COUNTY

Ute Oil Co.'s No. 1 Williams, C SW Sec. 23-12-24w..... S.D. 5,150 ft.

L. C. Hivick's No. 1 Davis, C NW NE Sec. 4-11-26w..... S.D. 3,420 ft.

WASHITA COUNTY

Miley Pet. Co.'s No. 1 Wolfe, NE SW Sec. 33-9-17w ..... Rig.

Cooper & Terhune's No. 1 Blocker, NW cor. Sec. 29-8-19w ..... Show oil 2,459-67 ft.; S.D. 2,757 ft.

Burns & Prince's No. 1 Deck, SW cor. Sec. 21-8-18 ..... Drlg. 1,570 ft.

OKLAHOMA PANHANDLE

TEXAS COUNTY

Three Way Oil Co.'s No. 1 Crane, SW NW Sec. 11-1-1E .. T.D. 4,720 ft.; to cement.

SOUTHERN OKLAHOMA

ATOKA COUNTY

Morris et al's No. 1 Ray, NE NW NE Sec. 8-2S-12 ..... S.D. 256 ft.

Brookshire's No. 1 R. W. Rowland, NW NE SE Sec. 18-3s-10 ..... S.D. 1,967 ft.

BRYAN COUNTY

Hughes' No. 1 Ayres, NE SW Sec. 30-7S-7 ..... Spudded, S.D.

CARTER COUNTY

Landy's No. 1 Spraggins, C NE NW SW Sec. 8-1s-2w .... S.D. 2,283 ft.; S.L.M.

JEFFERSON COUNTY

Smith's No. 1 McCarty, SE NW NE Sec. 18-4s-8w..... Location.

MARSHALL COUNTY

Curry et al's No. 1 Croft, NE NW SW SW Sec. 9-7s-6 ... Drlg. 580 ft.

Trailkill et al's No. 1 Spence, NE NW Sec. 10-7s-6..... Drlg. 790 ft.

Liggett et al's No. 1 McDuffee, SE NE Sec. 3-7s-6 ..... Pumping 20 bbls. 805-09 ft.; no gauge.

McCURTAIN COUNTY

Prassell et al's No. 1 Wagoner, SE NE Sec. 5-8s-27 ..... Show oil 560 ft.; 620 ft., S.D.

Stampfs et al's No. 1 Harris, SW NW SW Sec. 14-9s-25. S.D. 2,731 ft.

PUSHMATAHA COUNTY

Whitehead et al's No. 1 Messer, SE SW SW Sec. 35-3s-18 ..... S.D. 1,950 ft.

STEPHENS COUNTY

Gillette Bros.' No. 1 Cooley, NW SE NW Sec. 17-2s-8w.. Location.

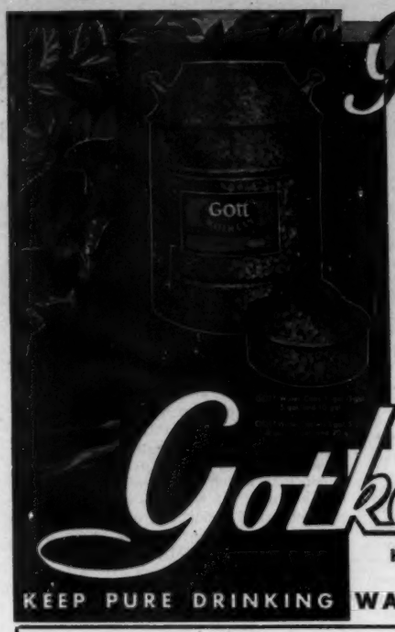
George's No. 1 Ryan, NW SW NE Sec. 31-3-15 ..... S.D. 510 ft.

J. A. KERR DIES

CHATHAM, Ontario, June 3.—John Archibald Kerr, senior member of J. & J. Kerr Co., Ltd., of Petrolia, Ontario, died recently at Toronto, following an operation. A native of Petrolia, Mr. Kerr joined his father's firm as a young man, and was intimately connected with oil operations in the Petrolia Field, having in recent years restored and increased his firm's production to a marked extent.

GEORGE GLOVER DIES

CHATHAM, Ontario, June 3.—George Glover, of Petrolia, Ontario, died recently at Detroit, Mich., aged 58. A native of Petrolia, he was widely known as a driller, working in Borneo, Colombia, California and Oklahoma fields.



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Discoveries and Extensions in Kansas

Another Hunton Lime Producer in Harvey County. Various New Producing Spots and Deeper Sand Showings

By W. A. Spinney
Staff Correspondent, Kansas Fields

The widening of the Hunton lime producing area was in prospect in Harvey County, Kansas, as the result of the second test finding a showing of oil in the lime. A showing of oil on the east edge of the Goodrich Pool, in Sedgwick County in the Viola lime, a new producing horizon for that area, indicates a resumption of drilling activities in that old field. The daily average production of the State has been steady during the last few months, but a decline is expected next week as the result of a reduction in the daily allowable of the Voshell Pool.

In the northwestern part of Harvey County, Stanolind Oil & Gas Co. and Amerada Petroleum Corp.'s No. 1 Froese, SW cor. NW, Section 20-22-3w, found the top of the Hunton lime at 3,481 feet and drilled to 3,492 feet where oil rose in the hole at the rate of 12 bbls. an hour. It is the second Hunton lime producer in the State, the first being the offset recently completed by F. Hollow on a church acre, in SW cor. NW, Section 20-22-3w, which made 600 bbls. initial production.

The next test expected to reach the Hunton lime is the Mid-Kansas Oil & Gas Co.'s No. 1 Doerkson, SE cor. NE, Section 19-22-3w, which was drilling near 3,050 feet.

Continental Oil Co. and H. Rosenthal's No. 1 Pinson, C SW SW, Section 15-25-1, in the east edge of the Goodrich Pool in Sedgwick County, found a showing of oil in the Viola lime at 3,391-93 feet. The chat formation failed to produce and the test was drilled to the Viola lime. It may open a new producing horizon for that area and cause considerable development if it makes a commercial producer. The Goodrich Pool was opened in December, 1928, when a wildcat well drilled by the Marland Oil Co. unexpectedly found oil in the chat formation. The discovery well made 5,000 bbls. of oil the first day.

Extension wells in the Wright Pool, near Valley Center in Sedgwick County, were given a production test. Gypsy Oil Co. and Continental Oil Co.'s No. 1 Bishop, NW cor. NE, Section 13-26-1w, was swabbing at the rate of 20 bbls. of oil and 25 bbls. of water a day from the chat at 3,058-3,160 feet. The well is more than a half mile from production in the field. The same companies' No. 1 Lambe, in Section 12-26-1w, was pumping 40 bbls. of oil and 240 bbls. of water a day from the chat.

On the east side of the Wright Pool, Continental Oil Co.'s No. 1 Rothfuss in Section 7-26-1, was plugged back to the Kansas City lime from the chat. After failing to make a producer it is being abandoned. It was an old well completed about three years ago producing from the chat.

Winfield Townsite

Operations on the Winfield Townsite in Cowley County continue busy. Work of preparing for new operations and the actual drilling is under way at a score of locations in the townsite. It is expected that new drilling permits will be announced during the week. Considerable leasing is going on and several blocks are practically completed on which locations may be expected.

Material for a rig was being moved in to the location back of Observatory Hill, by McMorrow and others in Section 22-32-4. Considerable preparatory work in the southern extension of the field is going forward.

Shell Petroleum Corp.'s No. 1 Lawrence, SE cor. NW, Section 35-19-3w, which made approximately 24,000,000 feet of gas a day from the chat, has been cemented and was drilling the plugs preparatory to being deepened. The gas was cemented off and it will be drilled deeper in search of oil production. The chat was found at 2,974-3,020 feet. The well was making around 360 bbls. of oil before being cemented. It is the fifth producing well in the new McPherson Pool. The other wells in the area have been drilled from 70 to 75 feet into the chat.

W. C. Snyder and others' No. 1 Carlson, SE cor., Section 4-19-3w, is a wildcat test preparing to start operations. It is located north of the new McPherson Pool production, and is expected to give evidence to which direction the producing area extends. It will also determine general geological conditions in the new field about which a great deal of uncertainty prevails. The new McPherson Pool has five producing wells which are estimated to have a potential of better than 5,000 bbls. a day, all producing from the chat formation. It is located north of the Voshell Pool and west of the Ritz-Canton Field.

Voshell Allowable

The daily allowable production in the Voshell Pool, in McPherson County, was reduced to from 53 per cent of its potential to 36 per cent June 1, according to the announcement of L. R. Pickrell, umpire and state agent. Under the order the area will be allowed to produce only 5,100 bbls. daily, instead of 6,300 bbls. as in the past.

The production was reduced on account of the curtailment in pipe line shipments by the Skelly Oil Co. which reduced its nominations from 4,000 bbls. daily to 3,000 bbls. Another reduction is expected on June 6, when the same company announced it would further reduce its shipments from 3,000 bbls. daily to 2,000 bbls.

The present daily potential production of the Voshell Pool, is 10,700 bbls. Umpire L. R. Pickrell, was attempting to arrange for further outlets of the crude oil.

White Eagle Oil Corp. also announced it would reduce its purchases of crude oil in the nonprorated areas June 1. Notice was received by operators that the company will run all the oil from its connections and would only pay for half of it with an option of purchase for the other half that was put into storage within a time limit, or it will purchase only one-half and pay for it.

Gas Conservation

At the meeting of operators and the committee on state gas conservation, held in Wichita, May 27, Raymond C. Moore, state geologist and chairman of the above named committee, reported that work was progressing on a code of rules to be observed in the conservation of gas in the State. As yet the committee had no rules or regulations to offer but was continuing the work and expected to have a definite report to offer within the next two or three weeks.

Open Rice County Wildcat

Carter Oil Co. and Tatlock and others' No. 1 Ploog, C SW SE Section 33-18-9w, Rice County wildcat, which was completed almost two years ago, was opened during the week for a production test and made 620 bbls. of oil in eight hours and was then shut in. The companies are constructing a pipe from the well to loading rack at Pollard, which is expected to be ready for movement of oil in a few days. A 10,000-bbl. storage tank has been erected near the loading rack at Pollard on the Frisco tracks. Three offsets may be started around the well as the result of putting the well on production.

A new test was announced during the week for eastern McPherson County, Hawkins, White and others' No. 1 in the NW cor. Section 28-17-1w. The test is located on a block of 2,000 acres in the vicinity. It is believed to be favorably located on a core-drilled structure.

Midwest Refining Co.'s No. 6 Brock, NW cor. Section 6-23-11w, Stafford County, found a showing of oil in a rotary core at a total depth of 3,535 feet, which is believed to be the top of the Silicious lime. The 8-inch casing will be landed at this depth.

In the Holyrood district of Ellsworth County, Slick and others' No. 1 Heiken, NE cor. Section 26-17-10w, filled up 1,800 feet with oil from the Silicious lime at 3,232-66 feet. Casing was being landed on top of the lime.

In the Blake area in the northeastern part of Reno County, two tests are expected to reach to sand in a few days. Olsen Drilling Co. and others' No. 1 Krehbiel, C NE NE Section 26-23-4w, found the top of the chat at 3,257 feet and was drilling at 3,278 feet. The test is expected to be drilled from 50 to 60 feet into the chat before cementing the casing. The other test is the same operator's No. 1 Roberts, C NW NW Section 25-23-4w, which found the chat at 3,258 feet.

Butler County

Harry Garden's No. 1 Brenmer, NW cor. SW SE Section 36-26-5, is a location.

Chase County

Ryan and others' No. 1 Lipps, C SE SW Section 25-18-6, was drilling at 200 feet.

Chautauqua County

Anderson and others' No. 1 Lemert, SW cor. NE SE Section 36-24-9, made 500,000 feet of gas from sand at 1,085-93 feet.

Cowley County

Murphy and others' No. 1 Reservoir, NE cor. NW NW NE Section 27-32-4, is a rig. Slocum and others' No. 1 Baker, NE cor. NW NE Section 27-32-4, is a rig. Stover and others' No. 1 Mier, SE cor. SW SE NW, Section 34-32-4, is a rig on the ground. Roth & Faurot's No. 6 Moncreif, NE cor. NW SE, Section 22-32-4, is a rig. Same operators' No. 1 fee, NE cor. SW SW SE, Section 22-32-4, made 100 bbls. of oil from the pay at 2,380-2,405 feet.

Ellsworth County

Slick and others' No. 1 Dreford, SW cor. NW Section 7-17-10w, is a rig. Skelly Oil Co.'s No. 1 Melchert, NW cor. SW Section 6-17-9w, is a rig. Aylward and others' No. 3 Stratman, SE cor. SW SE Section 1-17-10w, made 1,000 bbls. of oil after a 40-quart shot at 3,267-83 feet. Beardmore's No. 1 Stoltenberg, SE cor. NE SE Section 22-16-10w, was abandoned at 3,400 feet as a dry hole.

Graham County

Schleimeyer and others' No. 1 Smith, SE cor. Section 24-8-25w, is a rig.

Greenwood County

Mathews and Rex's No. 2 Newswanger, CWL SE NW Section 8-24-12, is a machine. Same operators' No. 1 Reeser, NE cor. Section 7-24-12, made 100 bbls. of oil from sand at 1,725-46 feet. Core & Phillips Petroleum Co.'s No. 4 Beal, SW cor. SE NE Section 28-23-11, was completed for 340 bbls. of oil after a 280-quart shot at 1,960-81 feet. Ward McGinnis' No. 3 Edwards, NW cor. NE NE Section 33-23-11, was plugged at a total depth of 2,000 feet. Same operators' No. 4 Edwards, NE cor. SW NE Section 33-23-11, was abandoned at 2,019 feet.

Harvey County

Brennan and others' No. 1 Salthouse, NE cor. SW SW Section 2-20-3w, is a rig.

McPherson County

Snyder and others' No. 1 Carlson, SE cor. Section 4-19-3w, is a rig. Mid-Kansas Oil & Gas Co.'s No. 1 Casey, NE cor. SW NW Section 35-19-3w, is a rig. Dickey Oil Co.'s No. 3 Decker, NW cor. SE Section 35-19-2w, is a rig. Skelly Oil Co.'s No. 1 Wilson, SE cor., Section 35-19-2w, is a rig. Davis and Rosenthal's No. 1 German, SE cor. SW, Section 17-19-1w, is a location. Barnsdall-Texas' No. 1 Aelmore, C NE NE, Section 22-19-2w, is an old well drilling deeper at 3,100 feet. Lario Oil & Gas Co. and Shell Petroleum Corp.'s No. 2 Boal, SW cor. SE NW, Section 24-19-2w, made 1,928 bbls. from sand at 3,408-15 feet. Same operators' No. 2 Gratton, NW cor. NE SW, Section 24-19-2w, made 1,798 bbls. after a 20-quart shot in sand at 3,400-09 feet.

Rush County

Flynn and others' No. 1 Budde, C NE Section 16-18-16w, was completed for 45,000,000 feet of gas a day from sand at 3,468-3,501 feet.

Reno County

Olson Drilling Co. and others' No. 1 Sabin, SE cor. NE Section 24-23-4w, is a rig. Same operators' No. 1 Goering, C NE NW Section 35-23-4w, made 59,500,000 feet of gas a day from sand at 3,232-3,322 feet. Jarvis & Wright's No. 1 Rainbow, NW cor. SE Section 33-22-7w, was abandoned in sand at 3,940-66 feet after finding water. Skelly Oil Co. and others' No. 1 Frantz, C NW NW Section 2-24-4w, is a location.

Rice County

Roy Ramsey and others' No. 1 Hilton, SW cor. NE SW Section 6-20-9w, is a rig. Empire Oil & Refining Co.'s No. 1 Masemore, SW cor. NW Section 18-20-9w, made 1,104 bbls. from the Siliceous lime at 3,315-24 feet.

Sedgwick County

Continental Oil Co.'s No. 1 Rauch, NW cor. NE SE SE Section 16-25-1, is spudding. Stearns-Streeter's No. 1 Mead, SE cor. NE SE SE Section 16-25-1, is spudding.

WILDCAT OPERATIONS IN KANSAS

(Descriptions are East unless marked otherwise)

BARTON COUNTY

Company, farm and location—	Remarks:
Midwest Ref. Co.'s No. 1 Scheufler, C SW SE Sec. 9-20-11w	Rig.
Skelton Oil Co.'s No. 1 Ott, C SE SE, Sec. 16-19-14w	Set liner 3,530-46 ft.; show oil; C.O. 3,600 ft.

BUTLER COUNTY

Cameron-Great Basin Oil Co.'s No. 1 Lardson, C SE NW Sec. 13-25-2	Rig.
Ramsey's No. 1 Michael, SW NW NW Sec. 18-27-3	Rigging up.

DICKINSON COUNTY

Severe et al's No. 1 Lavengood, NE SW, Sec. 13-13-2	S.D. 4,752 ft.

DOUGLASS COUNTY

Hewitt's No. 1 Dodder, CWL SW SW, Sec. 7-15-19	Water 1,230-35 ft.; abnd.

EDWARDS COUNTY

Mid-Kansas O. & G. Co.'s No. 1 Converse, SW NE NE, Sec. 30-24-18w	Underreaming 10-in. csg. 3,000 ft.

ELLSWORTH COUNTY

Slick et al's No. 1 Dreford, SW NW Sec. 7-17-10w	Rig.
R. Gear et al No. 1 Kroboth, SE NW Sec. 12-15-10w	S.D. 50 ft.

(Continued on Page 102)

Suttle's Good Well in Duval County

Estimated at 2,800 Bbls. Pipe Lines Nearby. Several Other Tests Started in New Government Wells Pool

By B. D. Stevenson
Staff Correspondent, Southwest Texas Fields

SAN ANTONIO, Tex., June 6.—For lack of storage the Suttle No. 1 Bennett in Survey No. 44, 3 miles north of production in the Government Wells Pool in Duval County, is shut in. The best indication of the capacity of the well was a gauge that indicated it was good for around 2,800 bbls. daily on a five-eighths-inch choke. There is about 2,000 bbls. storage on the lease and that is full. One 750-bbl. gun-barrel tank is being erected and two 1,000-bbl. tanks will be erected at once. Excepting Seacord & Putnam's gas well at 1,574 feet this oil well is the only producer in the district and is a 3-mile extension to the Government Wells Pool.

Two pipe lines, Magnolia and Humble, are near by. Other interests are also negotiating for the production, the general proposition being to take a minimum of 1,000 bbls. a day for a minimum of 300 days, build a pipe line 22 miles to the Texas Mexican Railroad at Benavides, erect 10,000 bbls. of storage on the lease, and such other storage as is necessary. The price they would pay for the oil is not named.

Suttle's No. 1 Bennett is an extra good well. An analysis of the production showed at one time 4 per cent drilling fluid and basic sediment, but this grew less, and the well was making no water when shut in. It was a little slow coming in. It had stood nearly a week with mud in the hole waiting for casing and the drilling fluid worked back into the hole. An attempt was made to rock the well in by using gas from Seacord & Putnam's No. 1 Johnson, a half mile away, putting pressure alternately on the casing and tubing and this pressure probably helped to work the drilling fluid back. When it failed to come in that way it was swabbed and this got results with a steadily increasing flow.

Late last week it was understood that negotiations were about completed for pipe line connection, but with some remaining details to be worked out and decided upon. The completion of the well, including setting casing and bringing it in, and erecting necessary storage, was done by the American Gas Co. of San Antonio, which has a substantial interest in the property.

New Work Started

The Magnolia Petroleum Co. last week started a direct north offset, No. 1 Gilbert Wendt, 150 feet from the south and east lines of the northwest quarter of Survey 44. The Suttle well is 150 feet from the north and east lines of the southwest quarter of Survey 44. The Magnolia company is also starting No. 1 Johnson, a quarter mile north and 300 feet east of the Suttle well.

Southwest Drilling Co. set surface casing at 100 feet and shut down for lack of water No. 1 R. Wendt, 150 feet from the south and east lines of Survey 43, a half mile west and half mile south of the Suttle well and Coffield started No. 1 H. Wendt, 150 feet from the east and south lines of the northeast quarter of Survey 43, a half mile west of the Magnolia Petroleum Co.'s No. 1 Gilbert Wendt. It will be at least two weeks before any of these are down to the pay horizon.

Around Sarnosa Pool

At the south end of the district, around the Sarnosa Pool, 2 miles southwest of the south extension of the Government Wells Pool, one dry hole and one probable producer, and considerable new activity is reported likely. Survey lines run diagonally with the world, in this new pool. Sun Oil Co.'s No. 1 Cano, 900 feet south of Smith & Capps' discovery well, and about the same distance due east of their discovery gas well, Friday last found the sand at 2,365-73 feet, compared with 2,375-95 feet in the Smith & Capps oil well and 2,355-2,413 feet in the Smith & Capps gas well. There is not over 1 foot difference in elevation.

The Sun Oil Co. set casing in the No. 1 Cano without making a drill stem test and expected to bring the well in early this week.

One mile east of Smith & Capps oil well, The Texas Company, at 2,700 feet, abandoned No. 1 Ruiz, 150 feet from the northwest and northeast lines of Survey 127. The Magnolia Petroleum Co.'s No. 1 Ruiz, in Survey 574, a direct southeast offset to the discovery oil well is started, the Magnolia and Sun tests being the only ones in the district at this time.

Three good sized blocks of acreage have been taken off to the southeast of the Government Wells group of pools on the theory of foldings parallel to the Reynosa Escarpment. Plymouth Oil Co. has lately leased about 10,000 acres a few miles east of the Sarnosa Pool and Earl Frates leased several thousand acres about 12 miles east and a little north of the Suttle test. Survey 213 would be about the center of Frates' block and Survey 113 about the center of the Plymouth block. Also Frates leased the Foster tract of about 3 sections approximately about 7 miles due north of Suttle's test. There is quite a lot of interest all over northern Duval County and operators are willing to look over any tract that is promising.

Balcones Fault Zone

Empire Gas & Fuel Co., late in the week, at around 2,155 feet in the No. 1 Walker in Caldwell County had not got into the chalk. It is a south offset to Bob Rose's No. 1 Pierce, which came in at 2,114 feet in a crevice in chalk, making about 3,000 bbls. of oil a day and is now pinched down to about 1,800 bbls. daily. Bob Rose topped the chalk at 2,050 feet. Thus far Bob Rose's No. 1 Pierce is the only producer. Meyer's No. 1 Walker, a mile northeast, was carried to the Edwards lime, and was a failure, and it is located about 1 mile north of Bob Rose's No. 1 Pierce. It was evidently a downthrow proposition and too far west, so there is a chance yet for a pool to develop. Two other locations have been made to the north of Bob Rose's No. 1 Pierce.

C. J. Webster Oil & Gas Co. is not through working with No. 1 McCrory, which came in a small well only 1 foot in the Edwards lime at 2,279 feet. It is located midway between the Luling and Dale Fields in Caldwell County. The casing was shot in the Buda section hoping to take in a good showing of oil there, but in milling out the shattered casing, trouble developed and instead of proceeding in that way a whipstock was put in and milled through the casing above the Buda lime. A new hole will be drilled alongside the other, taking in Buda lime and Edwards lime and the well recompleted.

Important Test

An important wildcat is being started in Lee County by Paton Brothers of California on the C. A. Turner 65-acre tract in the David Hudson Survey, 2 miles southeast of Tanglewood. It is to drill to the Edwards lime, or to 6,000 feet, and since there have been no Edwards lime tests in that immediate territory and very few in that sector of the Balcones Fault zone it is of especial interest.

Glen Stewart, geologist, worked out what is called the Tanglewood fault and blocked the acreage and turned the deal to Paton Brothers though Humble Oil & Refining Co. has had a block of acreage adjoining it for some time. The new test will be started soon.

Another important Edwards lime wildcat spudded in the past week is Sun Oil Co.'s No. 1 Tudyk, in northwestern Wilson County, in the John Turner Survey. It is a unitized operation in which Sun Oil Co., Magnolia Petroleum Co., Humble Oil & Refining Co. and Empire Gas & Fuel Co. are interested. It is a little east of the Cooksey Pool in eastern Bexar County which was the first unitized development in Southwest Texas and resulted in a new shallow pool.

Starr County

Announcement of two new 4,000-foot tests to be drilled in Starr County rather stimulated interest again in that territory. Jim Cloud, Inc., of Tulsa, has let contract to Worth B. Andrews of Fort Worth for two 4,000-foot wildcat tests in the northwestern part of the county on the Pedernal structure, one of the biggest in that part of the country. Work will start at once. The exact locations have not been announced.

Saxet Field

Saxet Field is to have a pipe line outlet. William F. Morgan is erecting an 80,000-bbl. tank at the Corpus Christi docks and will lay an 8-mile line from the Saxet Field to the tank and will handle the production of the field and ship by water. During the past week one good oil well was completed in the field and with more adequate pipe line outlet it is expected that there will be some additional development of the oil production of the field. At present it is a field of many sands but with only a few wells in each sand and mainly developed for gas production. Houston Oil Co. has taken a limited amount of oil from the field in the past.

William F. Morgan laid the first pipe line from the Refugio Field, a distance of about 38 miles, to Harbor Island and deep water loading at Aransas Pass.

Tule Lake Oil Co.'s No. 1 Hocker & Sevier, on quarter-inch choke, is flowing at the rate of 160 bbls. of oil a day and making no water. Total depth is 4,074 feet. This well holds more than ordinary interest because it is a mile north of the nearest production at that depth.

Reynosa Outcrop

In the broad belt from the Raccoon Bend Pool in Austin County southwest through the Pettus area to the Laredo district there are several wildcats of interest. Coyle-Concord Oil Co. in southern Colorado County which stood for a couple of weeks after setting surface casing has resumed drilling. It is rigged up with the world's biggest rotary rig and with no definite announced contract depth.

In northwestern Goliad County, John F. Camp and Stanolind Oil & Gas Co. are starting No. 4 Pettus. This is in a district several miles northeast of the Pettus Field. Neuhaus and the Stanolind company drilled the first test and got a small well. A little too small to be commercial. Two others drilled since by Camp and the Stanolind Oil & Gas Co. failed to pick up the sand which is the same as that producing in the Pettus Field.

Gulf Production Co. is drilling in southern Goliad, Humble Oil & Refining Co. in northern Goliad and Plymouth Oil Co. in eastern Goliad, and Slick & Seeligson are trying to pull liner in the No. 2 Allen in the Slick Pool in western Goliad County to deepen it. It gives the county unusual activity. Plymouth Oil Co. at 5,137 feet in No. 2 Parks is trying to get past heaving shale and the test is shut down waiting the arrival of special casing. Two other attempts were made in that territory on the Parks land to complete a well, one by Gibson Oil Co. and one by Plymouth, and each had trouble with heaving shale.

WILDCAT OPERATIONS IN SOUTHWEST TEXAS

Week Ending June 4

ATASCOSA COUNTY

Company, farm and location—	Remarks:
American Central Oil Co.'s No. 2 Mary McConnell, 150 ft. W of E line, 300 ft. S of No. 1, Blk. 138, W. C. M. Baker Sur., 3 miles W and 6 miles S from Somerset	T.D. 1,660 ft.; standing.
Glen Mathis' No. 2 Mrs. C. Martin, 100 ft. SE of No. 1	T.D. 2,980 ft.; standing.

BANDERA COUNTY

F. A. Brown's No. 1 R. B. Watson, western part of county	Rigging up.

BASTROP COUNTY

I. L. Champion's No. 1 Owens, 500 ft. to SE line, 600 ft. to SW line of 628-ac. tract, Isaac Cosner Sur.	T.D. 2,280 ft.; abnd.
Lonnie Evans and Dan Auld's No. 1 D. J. Orgain, 2,100 ft. from NW line, 2,775 ft. from SW line of Addison Littleton League	T.D. 1,782 ft.; abnd.
E. R. Marts and W. J. Beavens' No. 1 R. L. Carter, 450 ft. from NE line, 150 ft. from NW line of 100-ac. tract in George J. Glasscock Sur.	T.D. 2,524 ft.; abnd.

BEE COUNTY

Humble O. & R. Co.'s No. 1 Laura Thompson, 6,360 ft. from N line, 15,100 ft. from W line of tract in Garrett Roache Sur., S part of county	T.D. 5,560 ft.; plugging back.
J. L. Maulding's No. 1 Kimball, 300 ft. NE of Grayburg Oil Co.'s No. 1-A Kimball in S. Winship Sur.	Location.
C. F. Nichols' No. 1 J. P. Harris, Durango grant east of Tuleta	T.D. 2,275 ft.; drlg.
Texas Gulf Producing Co.'s No. 1 Webb Hearn, 1,000 ft. N, 43 degrees E, thence 300 ft. NW at right angles from Huriburt's No. 1 Wood in P. T. Irrigation Co. Sur.	T.D. 4,610 ft.; drlg.

BELL COUNTY

J. W. Riley's No. 1 W. S. Chaffin, in M. Griffin Sur.	T.D. 450 ft.; dropped till work starts.

BEXAR COUNTY

Amsden-Ingersoll-Miller's No. 1 Strumberg, 450 ft. to W line, 1,020 ft. to N line of tract, 12 miles SW of San Antonio	T.D. 810 ft.; S.D.
Lloyd Bender's No. 1 Suburban Irrig. Farms, 800 ft. No. of cen. of N line of K. K. Herring tract, 1 mile E of Kirk	T.D. 1,518 ft.; drlg. chalk.
S. W. Blount's No. 1-A S. A. Land & Dev. Co., 10 ft. from No. 1 in I. Perez Sur.	T.D. 900 ft.; drlg.
Eckert et al's No. 1 Edwards, 150 ft. to N and W lines of farm in Martinez Sur.	T.D. 1,490 ft.; to resume drlg.
Moore-Jauer's No. 1 Holly R. Ellison, 2,916 ft. from E line, 1,500 ft. from S line of farm in T. York Sur.	T.D. 2,170 ft.; whipstocking.

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Louisiana-Arkansas Drilling Increase

Several Large Wildcat Blocks Being Assembled. Three Dry Holes in Zwolle District. Continued Activity in Mississippi

By J. R. Crumpton
Staff Correspondent, Louisiana-Arkansas

SHREVEPORT, La., May 6.—New drilling operations in this division continue to show an upward trend, particularly in wildcat territory, with several large blocks being assembled each week with stipulated drilling clauses attached to the leases. The Zwolle Field in Sabine Parish is the only proven or semiproven area in North Louisiana with any activity, while the Jackson gas field in Hinds and Rankin Counties in Mississippi continues to maintain a number of drilling rigs.

Operators in this district are looking forward to a revision by the state legislature, now in session, of the state severance tax law which now levies from 7 to 11 cents per barrel on crude oil, depending upon the gravity. Forty and above carries the maximum levy of 11 cents. If this tax were revised to around 3 per cent of the gross price of crude at the well, it would stimulate wildcatting in North Louisiana, especially for the lower Trinity horizons.

New Wildcat Blocks

Six new wildcat blocks were announced as assembled or in the process of assembling during the past week, five of them in North Louisiana and one in south Arkansas. Vernon Parish, adjoining Sabine Parish on the south on the western border of central Louisiana, leads the other districts with three new wildcat operations to be started within the near future. The Llano Co-operative Colony, which owns about 5,000 acres surrounding its community, has derrick up for its No. 1 fee in Section 34-2n-9w. Northwest of the town of Leesville, Vernon Parish, W. G. Strange has assembled a block of 6,000 acres centering around Section 5-2n-9w. The contract calls for a well to begin within six months, the test to hold the leases for one year, after which time a rental of $1 per acre is to be paid until the expiration of the five-year period. Another block is being assembled north of the town of Slagle, the contract calling for the beginning of a well within 90 days after the block is completed.

In Winn and Natchitoches Parishes, near the town of Goldonna, the Sabine Bayou Development Co. is arranging to drill an interesting test on the Bodcaw Lumber Co. lease in the southwest corner of Township 12, Range 5. The location is in close proximity to the famous Drake salt dome from which salt was obtained during the war between the states in 1860. The test will be drilled to a depth of 3,000 feet unless oil or gas is found in commercial quantities. W. C. Feazel and Fred Kalil of Monroe have blocked 8,000 acres in the north part of Township 20, Range 6e, and the south part of Township 21, Range 6e, in Morehouse Parish. The contract calls for a well to begin on the tract not later than July 15. To the east in West Carroll Parish, Pat Hyde of Monroe has assembled 8,000 acres centering around Section 14-19-9, with a contract to begin a well by July 1. The leases are drawn up for five years with renewals of 50 cents per acre after the first year. In Ouachita County, Arkansas, David Lide of Shreveport and Charles Steele of Camden are rigging up to drill a 4,000-foot test in the center of Section 36-12-18.

Eight Completions

There were eight completions reported in this division during the past week, summarized as two gas wells, one oil well and five dry holes. In the southwestern part of Caddo Parish, near the Bethany gas field, the Calatex Oil & Gas Co.'s No. 1 Scott had an initial flow of 1,000,000 feet of gas from 2,952 feet. The other gas well was from the Rankin County area of the Jackson Field in Mississippi. James Alexander, trustee (formerly Owens & Weaver) completed his No. 1 Fitshugh, Section 1-5n-1e, with an estimated flow of 15,000,000 feet of dry gas from the chalk at 2,394 feet. The early flow of the well was of smaller volume, but it began to get better as it cleaned itself out and will probably gauge around 25,000,000 feet when thoroughly cleaned. The one oil well was from the southeastern part of the Zwolle Field. F. G. Reid's No. 1-A McNeely, Section 14-7-11, is a 20-bbl. pumper from 2,505 feet.

Zwolle Field

The Zwolle Field also furnished three of the dry holes with one each from Crawford and Union Counties, Arkansas. In the western extension of the Zwolle area, M. L. Friend's No. 1 Ezernack, Section 2-7-13, was dry and abandoned at 2,525 feet. The results of the test show the uncertainity of the chalk rock production of that field as it is less than one-fourth of a mile north of the same operator's No. 1 Nulton, completed last week as a 200-bbl. flowing well. In the southeastern extension, the Service Drilling Co.'s No. 1 Louisiana Long Leaf Lumber Co., Section 14-7-11, was dry and abandoned at 2,680 feet. This test is one-half mile southwest of Smitherman and others' No. 1 Gardner, a good flowing well, and between this well and other good producers to the south and west. In Section 2-7-11, Zeke Lohman's No. 1 McCormick, although having a good show of oil, was abandoned as dry at 2,680 feet.

In Crawford County, Arkansas, the Ozark Natural Gas Co. abandoned its No. 1 Jones, Section 32-9-31, at 2,552 feet. The test showed 500,000 feet of gas at the shallow depth of 1,409 feet, and had another good show at 1,814 feet, but failed to get production at the lower depth where other wells in that vicinity had been completed as fairly good gassers. The Drillers Oil & Development Co.'s No. 1 Pickering, Section 1-17-16, Union County, was abandoned at 2,300 feet. This well had a small amount of sand at 2,134 feet and a test developed some oil and considerable salt water.

Wildcat Tested

All of the wildcats tested during the past week showed negative results. The Security Petroleum Corp.'s No. 1 Swope estate, Section 16-9-1e, Grant Parish, swabbed dry at 1,583 feet, and is shut down waiting on orders. Six-inch casing had been set at 1,540 feet to test broken sand and shale to the total depth. In the northern part of Sabine Parish, J. M. Bridges' No. 1 Armstrong, Section 28-10-11, developed six fourbles of salt water on drill stem test from 3,350-90 feet. The crew is reaming to make another test at 3,371 feet, but comparing the present test with the logs of the Langbridge Oil Co. and Frank Foster, Inc., on the Stevens tract 4 miles southwest where gas and oil was encountered with no salt water around this depth, it is highly improbable that an oil or gas bearing sand will be found. Other wildcats are drilling in North Louisiana as follows: DeSoto Parish, Standard Oil Co. and Pelican Natural Gas Co.'s No. 1 Sutherlin, Section 19-12-14, drilling at 1,877 feet. This wildcat is about 4 miles southwest of the town of Grand Cane where several tests have been drilled within the past few years, several of which had good shows of oil and gas. The Standard test topped the chalk at 1,590 feet with the base at 1,860 feet, making a total thickness of only 270 feet of this formation which is considerably thinner than other wells had farther to the north. S. A. Guy's No. 1 Dowling, Section 31-14-14, topped the chalk at 1,650 feet and is drilling in chalk at 1,700 feet. Near the town of Longstreet, E. T. Oakes' No. 1 Bryant, Section 30-13-15, is drilling in lime and shale at 3,616 feet. Frank Ruderseale and others' No. 3 Nabors, Section 6-12-11, had a good show of gas at the top of the Nacatoch at 719 feet and topped the chalk at 850 feet. Arrangements are being made to set 6⅝-inch casing for a test with the bottom of the hole in chalk at 870 feet.

Deep Tests in Zwolle

The two deep tests in the Zwolle area, Sabine Parish, are making fair progress, although encountering no distinct shows of oil or gas during the past week. R. L. Gay's No. 1-A Long Bell Lumber Co., Section 10-8-13, is drilling on its second mile at 5,628 feet. The test encountered small streaks of anhydrites at 5,490 and 5,588 feet. The Loring Oil Co.'s No. 18 Bowman-Hicks, Section 15-7-12, in the southern part of the field, is coring at 5,190 feet.

D. S. Brooks, Inc.'s No. 1 Crossett Lumber Co., Section 31-15s-6w, Ashley County, Arkansas, on drill stem test developed five joints of drill mud from 3,155-74 feet and another test from 3,169-79 feet for 10 minutes developed 8 fourbles of salt water with a slight show of oil. The drill bit is now in lime at 3,505 feet. In Drew County, the Co-operative Development Co. is coring sandy lime at 2,205 feet in its No. 1 Ogles in Section 35-13-5. This test has been shut down since January. Fitzwater and others claim to have cored some oil sand at 2,850 feet in their No. 1 Beck, Section 33-15-26, Miller County. The last report from this wildcat was coring in shale at 2,920 feet. The Pigeon Hill Oil Co.'s No. 1 Union Sawmill Co., Section 19-17-12, Union County, is drilling in red beds at 3,693 feet. It is reported that the well will be drilled to 3,700 feet, the contract depth, and abandoned.

None of the wildcats in Mississippi developed anything of interest with the exception of the Lowndes County Oil & Development Co.'s No. 1 Carr estate, Section 34-17n-16e, in Lowndes County, northeastern Mississippi. This test is reported to have encountered the chalk a few feet under the surface with the base at 620 feet. A likely looking sand encountered from 1,040-45 feet tested dry and the crew is drilling at 1,075 feet.

Daily Average Runs

The fields of North Louisiana and Arkansas registered a decrease of 405 bbls. in daily runs during the past week. Daily average runs from the several pools were:

NORTH LOUISIANA	
Caddo, light	5,390
Caddo, heavy	1,900
Cotton Valley	570
De Soto and Red River	1,965
Elm Grove	225
Haynesville	4,460
Holly	285
Homer	2,880
Pleasant Hill	290
Sarepta-Carterville	770
Urania	3,570
Zwolle	6,855
Total North Louisiana	29,160
Total previous week	29,250
Decrease	150
ARKANSAS	
Champagnolle	1,350
El Dorado	3,040
Lisbon	510
Nevada	1,110
Smackover, light	2,900
Smackover, heavy	23,790
Stephens	630
Urania	150
Total Arkansas	34,030
Total previous week	34,285
Decrease	255
Total both States	63,130
Total previous week	63,535
Decrease	405

WILDCAT OPERATIONS IN LOUISIANA-ARKANSAS

(Rotary operations unless otherwise designated)

NORTH LOUISIANA

AVOYELLES PARISH

Company, well, farm name, section and block— Remarks:
Stauffer & Eshleman's No. 1 Caruth, Sec. 40-1n-7e.....Derrick abd.

BOSSIER PARISH

M. Miller et al's No. 1 Newell, 300 ft. S and W, NE cor., Sec. 12-19-11 .....Coring 460 ft.

CADDO PARISH

Pyramid O. & G. Co.'s No. 2 Beard, Sec. 9-8-16, 660 ft. S, 1,980 ft. W, NE cor. Sec. .....Tested dry 2,900 ft; plugged back to 2,750 ft.

CALDWELL PARISH

Carter Bell's No. 1 Taylor, 150 ft. S, 150 ft. E, NW cor. NE SE, Sec. 17-14-4 .....S.D. 3,397 ft.
Hudson et al's No. 1 Burton, Sec. 33-13-2e .....S.D. 2,950 ft.

CATAHOULA PARISH

National Drlg. Co.'s No. 1 Marsh McMiller, 70 ft. N, 100 ft. W, C, Sec. 26-9-6.....T.A. 3,097 ft.

DE SOTO PARISH

Coker et al's No. 1 Boone, 200 ft. N and W, SE cor. SW NW, Sec. 12-10-11 .....Derrick.
Donley & Chastain's No. 1 H. Smith, 325 ft. W, 600 ft. N, SE cor., Sec. 31-14-15 .....Repairing rig; T.D. 2,295 ft.
S. A. Guy's No. 1 Dowling, 469 ft. E, 382 ft. S, NW cor. NE, Sec. 31-14-14 .....Drlg. chalk 1,700 ft.
E. T. Oakes' No. 1 R. H. Bryant et al, 200 ft. N and W, SE cor. NE NW, Sec. 30-13-15.....Drlg. lime and shale 3,616 ft.
A. R. Smith's No. 1 Horn, Sec. 16-12-16, NE cor. Sec. ..Rigged up and S.D.
DeSoto Dev. Co.'s No. 1 Nickey, Sec. 7-13-12.....Derrick.
Rudeseale et al's No. 3 Naboes, Sec. 6-12-11 .....Arranging to set 6⅝-in. 870 ft.
Standard Oil Co. and Pelican Nat. Gas Co.'s No. 1 Sutherlin, 320 ft. N, 260 ft. W, SE cor. SW, Sec. 19-12-14 .....Drlg. chalk 1,877 ft.
Walters-Nicholson, tr.'s No. 1 Jim Guy, Sec. 3-11-13....S.D. 2,403 ft; repairing rig.

GRANT PARISH

Security Pet. Corp.'s No. 1 Swope est., Sec. 16-9-1e, 1,693 ft. N, 320 ft. E, SW cor. Sec. .....Tested dry; W.O. 1,583 ft.
O. Robichaux's No. 1 T. M. Bradford, 1,870 ft. E, 314 ft. S, NW cor., Sec. 16-9n-1e .....Location.

NATCHITOCHES PARISH

W. M. Coates' No. 1 Ross Olive, Sec. 10-9-10, 660 ft. S and E from cen. of Sec. .....Set 12½-in. 110 ft.
Dr. H. S. Gerson's No. 1 Smith, Sec. 11-10-8, 3,000 ft. N, NE cor. of irregular Sec. 10, in Sec. 11.....Drlg. shale 1,770 ft.
R. A. Keaton's No. 1 Stephens, Sec. 25-10-8, 320 ft. N and W, SE cor. NW NW.....S.D. 1,500 ft.

(Continued on Page 102)

What Do Inspections Show?

This announcement is addressed to the growing group of men responsible for pipe line condition who realize the importance of careful selection in protective coatings. All lines look good when they go into the ground, but after three, five, seven or ten years the correctness of the judgment used in selection of the coating comes to light. There are thousands of miles of inadequately protected pipe line right now which will have to be reconditioned within the next year or two or they will be too far gone to save.

Here are reports typical of very recent inspections:

OKLAHOMA:

"Mr. T——— recently inspected lines on which NO-OX-ID 'A SPECIAL' was applied six years ago. Material and lines are in perfect condition. Also inspected some pipe painted with a cheap black material only three years ago. The paint is not only gone but the pipe is badly pitted."

KANSAS:

"Saw Mr. T———— and he told me a great story about NO-OX-ID. Said they took up several miles of 6″ pipe southeast of ————City that was laid about eight years ago, and were surprised at the splendid condition of the pipe. It was necessary to cut the pipe at a stop valve, and they were amazed to find that the NO-OX-ID had penetrated quite a way into the metal. Mr. T——— is completely sold on NO-OX-ID. 'A SPECIAL' was used on this pipe."

In planning your reconditioning work, let us put the research and experience of this company at your disposal. Dearborn protective measures are not cheap nor are they costly. They are—most important—entirely reliable and assure you many years *additional* life for your lines in comparison with the average coatings on the market.

Inquiries invited.

NO-OX-ID
IRON-OX-RUST
TRADE MARK
The Original Rust Preventive

DEARBORN CHEMICAL COMPANY

"A House of Chemical Engineers" In Its Forty-fifth Year of Service to Industry.

310 S. Michigan Ave., Chicago **807 Mateo St., Los Angeles** **205 E. 42nd St., New York**

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Right design and right construction
for oil industry service

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Kennedy Valves are built to work effectively and dependably whether they are operated several times a day or infrequently. Each type is designed and tested to withstand far more than rated pressure and their ample margin of strength also protects against pipe strains and water hammer.

The extensive Kennedy line includes 400-lb., 700-lb., 1000-lb., 1600-lb., and 2500-lb. test gate valves, as well as many other types of gate, globe, angle and check valves for a wide range of service, together with standard types and sizes of malleable iron screwed fittings and cast iron flanged fittings.

The entire Kennedy line of valves and pipe fittings for a wide range of services, is fully described and listed in the Kennedy catalogue. Send for your copy today.

The Kennedy Valve Mfg. Co., Elmira, N. Y.

Representatives in principal oil centers.

KENNEDY
VALVES-PIPE FITTINGS-FIRE HYDRANTS

Conroe Well Estimated 1,200 Barrels

Strake Test Proves Producer, Making 38.9 Gravity Oil. Two Other Tests to North Being Watched Closely. Gueydan Dome Completion

By Nell Williams
Staff Correspondent, Gulf Coast Fields

HOUSTON, Tex., June 6.—Strake Oil Corp.'s No. 2 South Texas Development Co., Theodore Slade Survey, Conroe district, Montgomery County, Texas, definitely proved itself a producer when it came in Sunday after washing, flowing better than 48 bbls. hourly of pipe line oil. In the first 18½ hours up to 7 a. m. Monday it made 913 bbls., or at the rate of a little more than 1,200 bbls. daily. Production is through a three-eighths-inch choke with pressure of 750 pounds on the tubing and 900 pounds on the casing. Gravity of the oil is 38.9 degrees and temperature of the well 88 degrees. A total of 24 feet of 5⅛-inch screen was set in the sand at a total depth of 5,026 feet with liner and 2½-inch tubing to top.

It was scheduled to be brought in May 29 but after setting screen and tubing and being washed failed to flow. As the well had been washed only a short time operators figured heavy mud had clogged the screen and attempted to blow the well with gas from No. 1 South Texas Development Co., the discovery well, a gasser 2,200 feet north.

Blowing also failed to produce the well and in pulling tubing and screen to determine the difficulty operators found the screen up in the casing, where it presumably had been blown when the packer failed to hold. While the failure of the well to produce at first caused considerable disappointment, it now is felt that the trouble was entirely mechanical rather than due to the well itself.

This well on May 8 made a drill stem test of the sand at a total depth of 5,026 feet which filled the drill stem in a 15-minute return and blew to the crown block. It was conservatively estimated at that time that the well was good for between 1,000 and 2,000 bbls. Pressure was 200 pounds through chokes at the bottom and at the top. The oil was 36.6 gravity and dark green in contrast to the almost water white light gravity distillate yielded by the discovery well, primarily a gasser, and also by a second well, Heep Oil Corp.'s No. 1 Cartwright, John Davis Survey, 1¼ miles east, also a gas well making some fluid.

In the meantime, Heep Oil Corp.'s second test, No. 1 Freeman, also in the John Davis Survey and east of the Cartwright gasser, has picked up a sand and shale showing oil and gas. In a drill stem test of approximately 30 feet of the sand at a total depth of 5,137 feet, the drill stem was filled to the top in 15 minutes and the oil blew over the derrick. Seven-inch casing was seated and cemented at 5,085 feet. The oil in this well is still lower in gravity than in the second Strake well, testing 33.1 degrees. Pressure is reported a little stronger.

Changed Aspect

The discovery of oil in these two wells, over 1½ miles apart, has placed a considerably more important aspect on the Conroe district. Due to the fact that the first two wells were primarily gassers, there had been some hesitancy on the part of operators in entering the area and in addition there had been much skepticism of the possibility that the field might be anything except a small local condition with spotted production, characteristic of the Jackson from which the wells are producing.

The changing ideas of the district, however, are placing values on acreage and royalty not believed possible under depression times. An indication is given in the fact that one 20-acre piece, located over 2½ miles from the production, was turned late in the week for $500 cash and $500 in oil per acre. Rumors constantly are being spread concerning impending trades in which several majors figure. So far, Humble Oil & Refining Co. is the only major in the area in a large way, that company several months ago having traded with Strake Oil Corp. for 4,368 acres of the latter's block of more than 8,000 acres, and provided for an important development program. Humble, in addition, has considerable acreage to the north and east of the area and extending eastward along the trend through Montgomery County and into San Jacinto County. In the immediate Conroe district, with the exception of the Humble and Strake blocks, the acreage is pretty well split up among independents and probably will result in an intensive development program.

Two Other Tests

Two other tests now have reached the stage where they will be watched closely. Both of these are to the north and will play an important part in determining the trends and nature of the structural conditions. Heep Oil Corp.'s No. 1 Roberts, William H. Harrison Survey, approximately a mile and a half to the northwest of the same company's Cartwright gasser and more than 2 miles to the northeast of Strake Oil Corp.'s No. 1 South Texas Development Co., the discovery well, late in the week was drilling below 4,420 feet. Smith & McDaniel's No. 1 Sealey, Jonathan C. Pitts Survey, several miles farther to the northeast of the area, is drilling below 4,000 feet.

Gueydan Dome

The week also was featured by a number of important developments in the salt dome district proper. Included in these was Pure Oil Co.'s No. 2 Alliance Trust Co., on the Gueydan Salt Dome, Vermillion Parish, Louisiana, which came in flowing 38 bbls. of pipe line oil hourly from a sand at 4,029 feet. This well, the discovery producer on the dome, was completed in a sand at 3,532-52 feet April 22 when it came in flowing at the rate of 800 bbls. daily. However, on completion the well failed to hold up and after a short time started to make considerable water. In the second sand the well has proved more consistent so far and has gradually been building up, and in the 24 hours ending Saturday morning (latest figures available) it flowed 896 bbls. through a seven-sixteenths-inch choke. Pressure at that time had increased from the original pressure of 405 pounds to 600 pounds. Gravity of the oil is 27.2 degrees (corrected), which is slightly higher than the oil from the shallower sand.

Iowa Producer

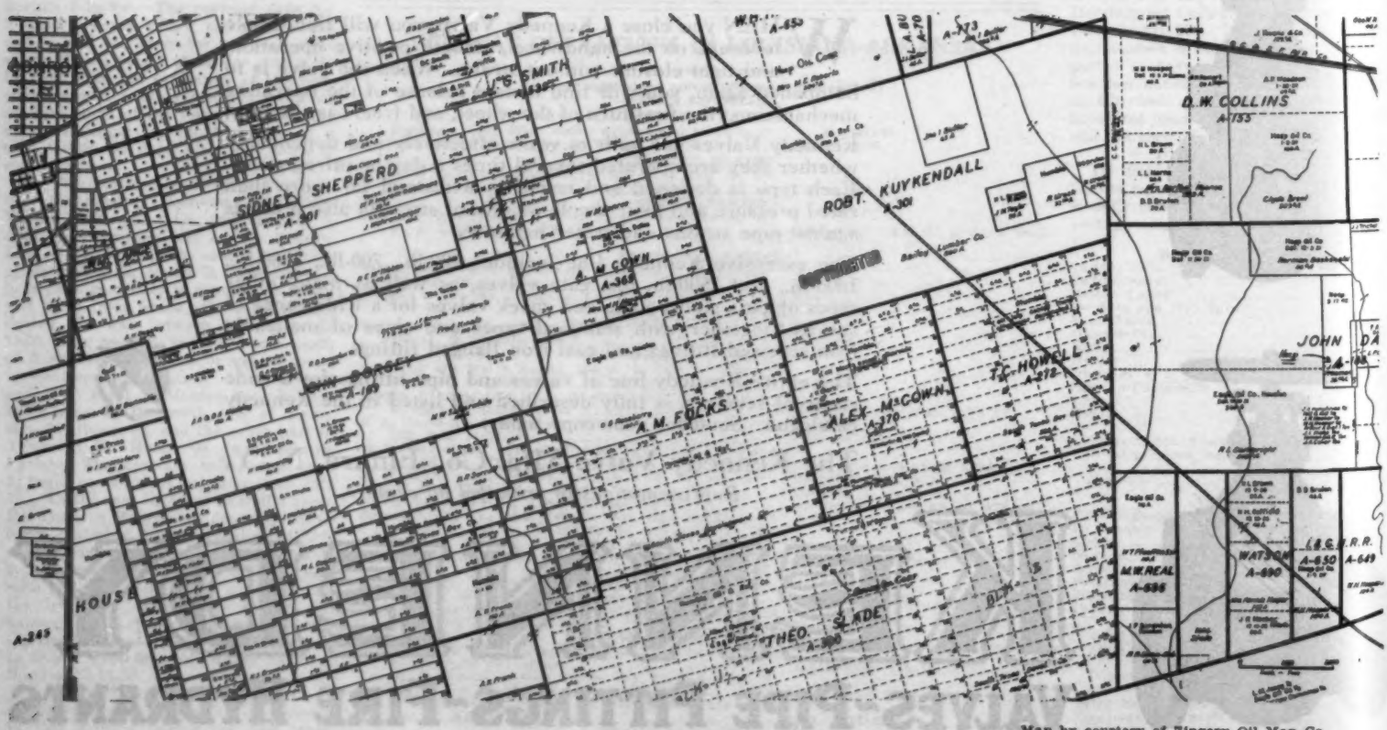
Shell Petroleum Corp. also has completed its second good producer at Iowa, on the Calcasieu-Jefferson Davis Parish line, in its No. 1 Fontenot, which offsets to the east Magnolia Petroleum Co.'s No. 1 Waite, discovery well. The Fontenot well set one joint of 5-inch screen in the sand at 6,895-6,912 feet and flowed 843 bbls. of pipe line oil in the first 24 hours, showing a pressure of 1,275 pounds on casing and 1,520 pounds on tubing, through a one-quarter-inch choke. Shell's first well, No. 2 Heyd, was completed early last month as a south offset to the Magnolia discovery well.

Lost Lake Completion

At Lost Lake, Chambers County, Pure Oil Co. completed its No. 15 Mayes. Although, as this is written, the well has not entirely cleaned itself, it is estimated good for between 200 and 300 bbls. of pipe line oil. A total of 97 feet of 5¾-inch (O.D.) screen was set at 2,800 feet.

Matagorda County

United North & South Development



Map of portion of Conroe district of Montgomery County, Texas.

Map by courtesy of Zingery Oil Map Co.

Co.'s No. 1 Stoddard, J. C. Keller Survey, near the townsite of Buckeye, Matagorda County, is preparing to make another attempt to swab. Operators the past week have been engaged in fishing bailer which was lost in the hole. The well has created considerable interest since it flowed several small heads of oil from a sand at a total depth of 7,831 feet. The well is a rank wildcat and forecasts another possible new field although deep, it being the deepest production on the coast.

Barbers Hill

At Barbers Hill, McAlbert Oil Co.'s No. 2-B Higgins, southeast side of the dome, came in during the week flowing 300 bbls. daily from sand at a total depth of 5,197 feet with 23½ feet of screen in the hole. Texas Gulf Producing Co. has not yet made a well of its No. 7-A Barber, northwest side. This well, which went through salt at 2,920-5,747 feet, had sand at a total depth of 5,861 feet but failed to flow and was being put on the pump when liner collapsed and casing broke two joints off bottom. Efforts now are being centered in running a full string of 7-inch casing inside the 9⅝-inch pipe. The latter company made two new locations on the east side of the dome, these being No. 2 Cornelia Barber and No. 10-H Kirby, each of which moves development still further into the center of the dome.

West Columbia

West Columbia, where there has been no new work for many months, is to have another test. Hogg and associates have made location for No. 1 Hogg in the Martin Varner Survey, being 1,250 feet north and 125 feet east of the southwest corner of Gulf Production Co.'s W. C. Hogg 200 acres. A derrick is up.

Mykawa and Genoa

Of some interest is the trade being completed by Crown Central Petroleum Corp. for an interest with Flannigan and associates in the latters' holdings at Mykawa and Genoa. Flannigan and associates several months ago made a deal with H. C. Cockburn for acreage in those areas formerly held but dropped by Humble Oil & Refining Co. Following acquisition of the acreage at Mykawa, those operators worked over one of Humble's former wells, No. 3 Minnetex, which has been flowing around 1,000 bbls. daily. They also are drilling at this time a location abandoned by Humble and late in the week were in shale below 4,780 feet expecting to pick up the pay horizon shortly. Under the new trade, organization of the Crown-Framer Oil Corp. has been formed to carry on development both at Mykawa and at Genoa, the latter a geophysical prospect as yet unproductive.

Lower Coastal Area

In the lower coastal country, interest is centered on E. M. Jones' No. 1-B Mitchell in the south end of the field which was reported to have encountered a sand showing oil and gas at a total depth of 9,167 feet, on which a string of 5-⅞-inch casing will be set for a test. As information has been withheld, very little is known concerning the hole. At that depth the well, if completed, will be the second deepest in the world. The deepest production at present at Refugio is in a 6,400-foot sand.

In the Fox extension, northeast of the Refugio Field, United Production Corp. completed its No. 5 W. J. Fox flowing 265 bbls. of pipe line oil from sand at 5,842-54 feet. Production is through two one-quarter-inch chokes with a working pressure of 175 pounds on tubing and 500 pounds on casing. This company's No. 3 W. J. Fox (formerly No. 2-A Fox), flowed salt water in sand at 6,464-80 feet. This well originally was completed in this sand at 6,466-74 feet last January but recently has been deepened to a total depth of 6,620 feet, where it was dry, and then plugged back.

Victoria County

T. B. Slick estate's No. 2 McFaddin, J. Varian Survey, north of the McFaddin district, southwestern Victoria County, is standing shut in after being completed as a dry gas well in sand at 4,485-94 feet. It is estimated good for 40,000,000 feet, 1,300 pounds pressure, through a nine-sixteenths-inch choke. It is the second gas well completed by the same operators but in a different sand (No. 1 being in a 3,500-foot horizon).

GULF COAST FIELDS AND WILDCATS

Week Ending June 4

RACCOON BEND—AUSTIN COUNTY

Company, farm and location—	Remarks:
Humble O. & R. Co.'s No. 2 McCasland, Wm. C. White Sur., 600 ft. southeasterly along SW line from NW cor. thence 200 ft. northeasterly at right angles	Drlg. shale 2,817 ft.

BARBERS HILL—CHAMBERS COUNTY

R. E. Ferrell's No. 2 Wilburn, Henry Griffith League, 215 ft. W of No. 1 in center of 45-acre tract	Lime 2,527 ft.
Humble Oil & Ref. Co.'s No. 1 Kirby, Henry Griffith League, 520 ft. N along E line from SE cor. of tract, thence 75 ft. W at right angles, thence 75 ft. N at right angles	Location.
McAlbert Oil Co.'s No. 2-B Higgins, Wm. Hodges Sur., 265 ft. from N line and 50 ft. from W line of tract	Set 23½ ft. of 3-in. screen 5,197 ft.; comp. flowing 360 bbls. oil; 110 lbs. pressure; ½-in. choke.
Mills Bennett Prod. Co.'s No. 4-A E. W. Barber, Henry Griffith League, 300 ft. W of No. 3-A, 50 ft. N of S line	Drlg. anhydrite 1,369 ft.
Mills Bennett Prod. Co.'s No. 3 Kirby, Henry Griffith League, 645 ft. E, 40 ft. S, NW cor. of tract	Calcite 1,118 ft; cmtd. 13⅜-in. csg.
Mills Bennett Prod. Co.'s No. 4 Means, Henry Griffith League, 150 ft. W of No. 3	Drlg. calcite 1,225 ft.
Rio Bravo Oil Co.'s No. 3 Fisher, Wm. Bloodgood Sur., 300 ft. E and 33 ft. S of NW cor. of tract	T.D. 4,166 ft. in cavity; reaming to bottom.
Sun Oil Co.'s No. 3 Higgins, Wm. Hodges Sur., 50 ft. from E line of tr. and direct offset McAlbert Oil Co.'s No. 2-B Higgins	Drlg. sand and gravel 585 ft.
Sun Oil Co.'s No. 14 J. Wilburn, Henry Hodges Sur., 150 ft. W of No. 13 and 50 ft. from N line	Drlg. shale 3,904 ft.
The Texas Company's No. 6 Wilburn (D.D.), Henry Griffith League	D.S. stuck 5,129 ft.
Texas Gulf Producing Co.'s No. 7-A Barber, Henry Griffith League, 713 ft. from W line and 225 ft. from N line of tract	Set 90 ft. of 7-in (O.D.) screen 5,861 ft; tried to pump and liner collapsed and 9⅝-in. csg. broke; trying to set full string of 7-in. csg.
Texas Gulf Prod. Co.'s No. 3 Ilfrey, Henry Griffith League, 260 ft. W of No. 2 in center of tract	Drlg. sticky shale 3,356 ft.
Texas Gulf Prod. Co.'s No. 10-B Kirby, Henry Griffith League, 450 ft. E of No. 9-B and 250 ft. S of N line	Drlg. salt 2,785 ft; top of salt 1,527 ft.
Texas Gulf Prod. Co.'s No. 2 Cornelia Barber, Henry Griffith League, 514 ft. W, 41.5 ft. S of NE cor. of tr.	Derrick.
Texas Gulf Prod. Co.'s No. 10-H Kirby, Henry Griffith League, 30 ft. W of No. 3 Ilfrey	Location.

LOST LAKE—CHAMBERS COUNTY

Pure Oil Co.'s No. 15 Mayes, E. Wallis Sur., 450 ft. NE of No. 11 and 450 ft. NW of No. 14	Set 97 ft. of 5¾-in. screen 2,800 ft; flowing 200 to 300 bbls. oil while cleaning through open tubing.

RABBS RIDGE—FORT BEND COUNTY

Gulf Prod. Co. and Humble Oil & Ref. Co.'s No. 2 Booth-Meyers, John Rabb Sur., 1,500 ft. E of No. 1	Rig.
Gulf Prod. Co. and Humble O. & R. Co.'s No. 1-A Booth, Samuel Kennedy Sur., 445 ft. N of S line due N of No. 1 T. R. Booth	Drlg. sticky shale 4,453 ft.
Gulf Prod. Co. and Humble O. & R. Co.'s No. 2-A T. I. Booth, Samuel Kennedy Sur., 445 ft. N of S line and 575 ft. E of No. 1-A	Location.
Humble O. & R. Co. and Gulf Prod. Co.'s No. 2 Davis, Robt. Peebles Sur., 2,483 ft. E, 150 ft. S of NW cor. of 1,000-ac. tr.	Location.
Humble Oil & Ref. Co. and Gulf Prod. Co.'s No. 3 Lockwood, John Rabb Sur., 1,000 ft. due E of No. 2	Sand and shale showing oil 5,132 ft; cmtd. 7-in. csg. 5,091 ft.
Humble O. & R. Co. and Gulf Prod. Co.'s No. 4-A Lockwood & Sharp, J. Rabb Sur., 1,000 ft. E, 300 ft. N of SW cor. of Tr. 3	Location.

(Continued on Page 100)

ONE PRODUCER, ONE DRY HOLE WEEK'S RESULT IN MICHIGAN

By George A. Whitney

MOUNT PLEASANT, Mich., June 6. While there are a lot of drilling operations in the Central Michigan Field, the past week recorded only two brought in, one an oil producer and the other a dry hole, or rather water hole. The producer is Gordon Oil Co.'s No. B-4, located 990 feet from the north line and 330 feet from the west line of the N. J. Skinner farm, NW NE NE Section 16, Greendale Township, Midland County, and rated with an initial of 600 bbls. from the Dundee formation at a total depth of 3,569 feet.

The dry hole was drilled by Walter L. McClanahan, Inc., 990 feet from the north and east lines of the Hughes estate, SW NE NE Section 20, Geneva Township, Midland County, at a total depth of 3,671 feet. This test was about 4 miles north of the proven East Pool, and located within a radius of about a mile and a half from two dry holes, and when started drilling was attracting considerable attention from nearby leaseholders. At 35 feet in the Dundee formation the test made a fair showing of gas and at lower depth before water was struck two shows of oil were passed through. Operators receiving reports on the well were not ready to completely condemn the surrounding territory. However, three tests were made in that area and none made showings for a commercial well. The two other wells were drilled in Sections 19 and 29, and it appears that the structure thins out too much for a producing zone.

A few wells are nearing the pay formation and should be completed during the next couple of weeks, unless fishing jobs or something else delays them. W. Hunter Atha's test on the Chemical State Savings Bank property, SW SE Section 21, Ingersoll Township, Midland County, is drilling in the Dundee at a depth of 3,440 feet. Mid-Bay Oil Co.'s test on the G. W. Patrick farm, E half W half NE Section 24. Midland Township, Midland County, is reported at a total depth of 3,600 feet. This test topped the Marshall formation at 1,160 feet, Berea sand at 2,330 feet and Travers formation at 2,830 feet. There was a showing of oil in the Travers formation at 2,837 feet. This well is 3½ miles east of the city of Midland and may make a test to the Trenton limestone which produced so much crude in northwestern Ohio during the past 42 years or more.

Pure Oil Co.'s No. 1 well, 990 feet from the north line and 330 feet from the west line of the John J. Bolan farm, NW W half NE Section 16, Midland Township, Midland County, reported at a depth of 3,400 feet and should be brought in within a short time.

W. L. McClanahan, Inc., is drilling at 2,300 feet in No. 6 well, 490 feet from the north line and 330 feet from the east line of the A. J. Struble farm, NE SE SW Section 10, Midland Township.

Talbot Oil Co.'s No. 1 in the northwest corner of the Frank Adams farm, NW SW SW Section 10, Midland Township, is drilling close to 3,400 feet.

Jones and others' No. 1, in the northwest corner of the Jones-Woodruff farm, NW NW SW Section 13, Midland Township, is shut down at a depth of 3,000 feet. This well was shut down for a long period around 1,250 feet.

G-Lee-P-Oil Development Co.'s test in the northeast corner of the Carl W. Schaeffer, E half W half SW Section 12, Midland Township, is reported drilling around 3,250 feet.

Braden-Saunders Co.'s No. 1, in the northwest corner of the Kate Stapleton, NW NW NE Section 13, same township, is drilling close around 2,900 feet.

R. D. Malcolm and others' test in the northeast corner of the Vernon G. Hastings farm, NE NW Section 13, Midland Township, is drilling close to 2,100 feet.

Sun Enters Field

Much interest is taken in the Central Michigan Field in the announcement that the Sun Oil Co. is entering the field with 2,520 acres of wildcat property, conditional on the approval by the State Conservation Commission of the terms of state-owned land. The property in which the Sun company is interested is in Jerome Township, Midland County, northeast of the East Pool. The Shell Petroleum Corp. is also asking approval from the State of a similar lease of 380 acres north of the main field in Geneva Township, Midland County. Both companies will execute the standard lease, providing one-eighth royalty and 50 cents an acre actual rental. The premiums offered are $136 by the Sun company and $54 by the Shell corporation. This announcement serves to confirm a prediction of the most extensive campaign of wildcat drilling during the next few months the field has experienced. The increase recently made by the Pure Oil Co. of its quotation for Michigan crude from 55 cents to 65 cents a barrel is regarded as a strong incentive for prospecting and is accepted here as a sign of a continuing upward price trend.

East Pool

A year old in May, the East Pool of the Central Michigan Field, is one of the richest oil-producing districts in Michigan and from it today the bulk of the State's crude is being produced. The discovery well of the pool, located on the George Hornick farm, Section 15, Greendale Township, Midland County, and drilled by the Columbia Oil & Gas Co., was brought in early in May, 1931, with an initial flow of approximately 800 bbls. in 24 hours. The Hornick wildcat at that time was more than 3 miles east of production and no wells had been struck that far east of the oil field.

Since the strike on the Hornick farm 45 wells have been drilled in the pool, ranging from 125 bbls. a day to upwards of 4,000 bbls. a day. Approximately 1,500,000 bbls. of oil have been produced in the pool. The pool is approximately 4 miles long and 2 miles wide and more than 1,500 acres have been proven as oil producing.

More than 20 tests are being drilled in bordering areas of the pool at the present time. Geologists believe the pool has great possibilities of future development and predict that at least 15,000,000 bbls. of oil are recoverable from it. Of the 14,000 bbls. of oil a day being taken from the Central Michigan Field at the present time, about 80 per cent is being produced in the East Pool.

Increased Activity in Colorado Area

Northeastern Section Has One Well Spudding and Two Rigs. Washington State Test Spudded. Test in South Dakota. Resumption at La Barge

By Tolbert R. Ingram
Staff Correspondent, Rocky Mountain Area

DENVER, Colo., June 7.—The committee appointed to investigate the price of crude in the Hobbs Pool as compared with West Texas crude found that the octane content in the lower grades was a factor that offset the slightly higher gravity of the Hobbs crude. The Midwest Refining Co.'s No. 8 Terry in the Hobbs Pool was rated at 821 bbls. daily. The Continental Oil Co. is ready for a production test of its deep well on the Rattlesnake Dome.

In Colorado, the northeastern part of the State is showing increased activity with one well spudding and two rigging up. Two wells were abandoned in Fremont County and one in Montrose County and a test is being started on the McElmo Dome in Montezuma County.

In Wyoming, the fate of the Mutual Syndicate's test on the Midway Dome is about to be determined. A 300-bbl. well was completed in the Osage Field and The Texas Company made a location on the Alkali Butte structure in Fremont County. The California Petroleum Corp. is resuming drilling operations in the La Barge Field.

Montana reported a 40-bbl. well in the Pondera Field and a 10-bbl. completion in the Kevin-Sunburst district.

Ohio Oil Co.'s test in the State of Washington has spudded.

The Chadron-Osage Oil Co. is trying for the $25,000 reward for the first commercial producer in the State of South Dakota.

NEW MEXICO

Lea County

Last March, E. G. Allen, chairman of the executive committee in charge of proration in the Hobbs Pool, appointed a committee composed of H. M. Stalcup of the Skelly Oil Co., K. Winship of the Gypsy Oil Co. and C. O. Moody of the Mid-Continent Oil Co. to investigate the price of crude in that field. This action was taken in response to an inquiry by Gov. Arthur Seligman as to why the price of Hobbs crude is not higher. None of the committee is connected with any of the agencies purchasing Hobbs crude. The report of the committee has been submitted to Governor Seligman. It justified the parity of prices of Hobbs and West Texas crudes and pointed out that the octane content of the crudes is an important factor that equalizes the slight difference in gravity. Governor Seligman has replied, taking issue with the committee on its basis of figuring crude costs. Hobbs crude has a slightly higher gravity than West Texas crude, but the committee took into consideration the higher octane rating of the lower grade oils as an equalizing factor.

There were no completions or new locations in the Hobbs Pool. Midwest Refining Co.'s No. 29 State, C SW SW Section 10-19-38, the last completion, when tested for proration, was given a rating of 821 bbls. of oil and 450,000 feet of gas. Midwest's No. 11 Byers, C NE NE Section 4-19-38, is drilling at 1,473 feet in the red beds after cementing the 17-inch at 211 feet with 125 sacks. Same company's No. 29 Turner, C SE NW Section 34-18-38, is building rig, and its No. 26 State, C SE NE Section 9-19-38, cemented the 16-inch at 210 feet with 125 sacks.

Amerada Petroleum Corp.'s No. 1 Hardin, SW cor. Section 18-18-38, in the north end of the field, is drilling at 3,897 feet and will be an early completion. This is an outside well.

Texas Pacific Coal & Oil Co.'s No. 3-G State, C SE Section 34-18-37, is drilling at 3,524 feet in anhydrite. It topped the brown lime at 2,825 feet and had the first gas at 2,840 feet. This is an outside well on the northwest.

The Texas Company's No. 3-A State, C Lot 2, Section 2-21-33, Lea district, is building rig.

Eddy County

W. A. Scott's No. 1 Kaiser, NW SE Section 7-18-27, southwest of Artesia Pool, is drilling at 677 feet in anhydrite. Flynn, Welch & Yates' No. 62 State, NW cor. SE Section 10-19-28, is drilling at 1,075 feet in anhydrite and shale. Leonard & Levers' No. 7 State-Levers, C SW SE Section 20-17-29, Jackson district, is drilling at 1,000 feet in shale and anhydrite. It encountered a flow of gas estimated at 750,000 feet per day at 943-45 feet.

Curry County

G. W. Trout and others' No. 1 Hart, NW SW NW Section 24-2n-31, is shut down at 958 feet and probably will be abandoned.

Chaves County

R. D. Compton's No. 1 Emerson, SW SW SE Section 20-10-24, Roswell district, is moving in machine.

De Baca County

Matador Oil Co.'s No. 1 Wood, NE SW SW Section 6-4n-20, Salada Creek, is bottomed at 4,662 feet and fishing for 1,000 feet of drilling line and string of tools 100 feet off bottom. The hole is caving at 3,500 feet.

Landowners Oil Co.'s No. 1 McAdoo, SW cor. NE Section 16-1s-27, Buffalo Creek, is drilling at 4,827 feet in the red beds and carrying the 6⅝-inch at 4,791 feet.

San Miguel County

Cabra Springs Oil & Gas Co.'s No. 1 Thompson (formerly Hershfield Oil Development Co.), C NE Section 21-12-22, Pinon Mesa, is shut down at 2,540 feet to convert to steam power.

Bernalillo County

Norins Realty Co.'s No. 1 Pajarito grant, NW cor. NE Section 22-9n-1e, is bottomed at 1,275 feet and fishing for 12½-inch pipe.

Rio Arriba County

Governador Dome Oil Co.'s No. 1, NW NE NE Section 15-29-7w, set pipe at 2,070 feet for a water shutoff. It is supposed to be near the top of the first Farmington sand.

San Juan County

Continental Oil Co.'s No. 24, SW NW SW Section 1-29-19, Rattlesnake Dome, set the 7-inch at 6,505 feet and will test. E. J. Nicklos and John C. Nicklos, of the production department, were due to arrive the first of this week by airplane from Ponca City to witness the bringing in of the well. It is the second test drilled to the Pennsylvanian on this structure. Total depth is 7,370 feet. Location has been made for No. 29, which will go to the shallow sands.

COLORADO

Weld-Morgan Counties

Tulsa-Fort Morgan Petroleum Co.'s No. 1 Anthes, C NE NE Section 24-8n-59, New Raymer district, is drilling below 1,330 feet after shutting off two water sands at 880-90 and 980-1,010 feet with the 15½-inch at 1,048 feet.

The location has not yet been released for the joint operation to be drilled by Ramsey Brothers, Danciger Oil & Refining Co. and a third party in the New Raymer district. Manning & Terry, drilling contractors, have the contract. Location probably will be either in the N half, Section 14-7n-59, or NE Section 15-7n-59.

Weld Royalties Co.'s No. 1 Peters, SE cor. Section 28-9n-61, 6 miles west of Keota, began spudding May 29. It is being drilled with cable tools.

In the Greasewood district, Ohio Oil Co.'s No. 1 Butters, C SW SW Section 7-6n-60, in Morgan County, has derrick completed. It is planned to use only one string of casing in drilling this well, the 7-inch, which will be landed on top of the Muddy. Gas for fuel will be obtained from Continental Oil Co.'s No. 1 Briggs.

Manning & Terry's No. 1 Niles, C SE NE Section 13-6n-61, joint with Continental Oil Co., Platte Valley Petroleum Co. and a Chicago syndicate, is digging slush pits and laying water and gas lines. Gas will be obtained from the No. 1 Briggs well.

Continental Oil Co. is now taking all the production in the field. Platte Valley Petroleum Co. shipments to the refinery at Orchard were discontinued on May 17.

Jackson County

Mrs. Rosamonde Hoye of Denver has filed suit against Continental Oil Co. in which she seeks to collect $92,000 damages for alleged breach of contract. Continental drilled its No. 1 Hope, NE SW NE Section 34-9n-78, on the Hoye permit on the South McCallum Dome in 1927-29. It encountered gas at 4,875 feet which blew the tools 2,000 feet up the hole and caused a bridge. It was cleaned out and drilled a few feet deeper when it again bridged. The well is similar to the famous "ice cream" well on the North McCallum Dome, which produced high grade oil with gas that came out at a temperature of 110° below zero.

Grand County

Oil & Mineral Lands, Inc.'s No. 1 McElroy, SE SW Section 14-2n-81, Kremmling district, which shut down a year ago, is resuming at a corrected total depth of 618 feet. The Dakota is expected at around 800 feet.

Fremont County

P. W. Harr's No. 1 Dia Giacomo, NE cor. Section 11-19-70, Canon City district, was dry and abandoned at 2,490 feet. A show of oil at 2,185 feet was not commercial. Harr's No. 1 Gindro, NE SW SW Section 27-19-70, near Chandler, was dry and abandoned at 786 feet in the Morrison. Both wells had been standing for some time.

Montrose County

Uncompahgre Oil & Gas Co.'s No. 2 Vandemark, SW cor. Section 27-50n-10w, Olathe district, has let contract to Mr. Freeland, and is preparing to resume at 800 feet. Casing and materials are being moved from No. 1, SE SW NW Section 27-50-10, which is being abandoned at 2,031 feet. It had several good oil and gas shows, but hole was not in condition to determine value of same.

Garfield County

Fulton Petroleum Co., which drilled in a 30,000,000-foot gas well in its No. 1 Smith, SE NE NW Section 8-8s-102, Garmesa Dome, in 1930, has been granted a two-year extension by the voters of Grand Junction in which to construct a pipe line to that city. The company was granted a 25-year franchise two years ago.

Montezuma County

L. E. Tague, drilling contractor, is rigging up for a test in the McElmo Canon district for a syndicate composed of H. L. Oliver, J. J. Downey, Carl H. Smith and others. Location is on the West lease, NW NE Section 31-36-17w. It is planned to test sands in the red beds which had good shows in a well drilled by Midwest Oil Co. in 1922 in Section 23-36n-18. This well had a show of oil at 1,740 feet and 100 feet of oil in the hole at 1,890 feet. These were shut off and drilling continued to 4,588 feet. It had 4,000,000 feet of gas at 4,217 feet and a show of oil at 4,150 feet.

Rio Blanco County

Magnolia Petroleum Co.'s No. 1 Maddock, C NW SE Section 9-2s-96, Piceance Creek, is drilling out cement at 2,914 feet, where 6⅝-inch was set on top of the gas sand.

WYOMING

Natrona County

Mutual Oil Syndicate's No. 2, C SW SE Section 14-35-79, Midway Dome, is at this writing at a critical stage with the final outcome in the second Wall Creek sand still in doubt. Coring was in progress Monday and 16 feet of sand at 5,236-52 feet was reported to have shown saturation. However, the quantity of oil in the core was not sufficient to cause much enthusiasm and one report was to the effect that the first core taken out showed water. The sand was found 60 feet lower than in the test drilled by Midwest Refining Co. just to the southeast. In the Midwest well water was encountered in the lower part of the sand. The showing in No. 2 was accepted by S. H. Keoughan, head of the syndicate drilling the well, to be promising enough to run and cement 7-inch and make a test. It was decided to take another core before doing this, however, and this work was in progress at last reports.

Lakota Oil & Gas Co.'s No. 4, SW NW Section 31-37-81, North Casper Creek, has cleaned out to bottom and resumed drilling. It is making hole close to 1,000 feet and expects the gas sand inside of the next 100 feet. This company proposes to supply Casper with natural gas and has placed $10,000 on deposit in a Casper bank in connection with an investigation by the city council as to the available and future supply from this source and for the appraisal of the Casper distributing system of the New York Oil Co., which at present supplies Casper with natural gas from Fremont County fields. The proposal involves a plan for the acquisition of the local plant by the city. The Lakota company has two gas wells and one oil well at North Casper Creek and recently authorized the drilling of 10 wells to the gas horizon, of which three are to be put down at once.

Jarvis & McDonald's No. 1 Government, SE cor. Section 31-30-81, Spindletop Dome, is drilling below 825 feet. The objective is expected at around 1,050 feet.

Weston County

A good completion was reported in the western extension of the Osage Pool in Weston County in the Federal Oil Co.'s No. 2, CEL NE SE Section 15-46-64, near where some of the best producers in the field have been found lately. It topped the Muddy at 2,075 feet and was drilled to 2,090 feet in a close sand. It flowed 200 bbls. over night and has continued at better than 300 bbls. per day without being shot.

General Oil Co.'s No. 1, SW cor. NW Section 15-46-64, is rigging up, and the Central Oil Co.'s No. 1, NE cor. SW Section 15-46-64, is about ready to spud. Lambie Oil Co.'s No. 8 Bock, SW cor. NW Section 14-46-64, is spudding. In the old part of the field, Carl Cundy's No. 3, NE NW NE Section 31-46-63, is spudding, and Charles F. Marten's No. 17, CNL NW SE Section 19-46-63, is drilling at 300 feet.

Julius Peters' No. 1 Witzell, SE cor. NW Section 30-46-64, to the southwest

of Osage, on the Fiddler Creek structure, is drilling at 3,950 feet.

Niobrara County

Continental Oil Co.'s No. 4 Rohlff, NW SW SW Section 32-36-65, Lance Creek, is moving in preliminary to deepening from 2,960 feet to the gas sand.

Converse County

Continental Oil Co.'s No. 30 Converse Sheep, SW SE SE Section 4-33-76, Big Muddy, is drilling at 1,560 feet with the Lakota as the objective. The 12½-inch was cemented at 257 feet. Ohio Oil Co.'s No. 25 Kinney, SE SW SE Section 4-33-76, has rig completed. Mountain States Power Co. has extended its transmission line to the field and both of these operations are using electric drives for the rotaries.

Fremont County

The location for The Texas Company's No. 2 State-Ridway, on the Alkali Butte Dome, has been staked in the SE SW SW Section 36-34-95. Two water wells recently were drilled to build up a supply of water for a rotary operation. Heretofore cable tools have been used in testing the structure and the dipping beds have caused considerable trouble with crooked holes. The new location is just east of the company's No. 1 State, which skidded the rig several times and finally completed the well as a gasser without being able to reach the lower horizons which it was planned to test. The new location was made a little lower on structure in the hope of missing the heavy gas pressure and getting into the oil sands.

Ward Oil & Gas Co.'s No. 2, NE cor. Section 28-34-90, Button Basin, spudded June 1 and will be drilled with a rotary. No. 1 was lost at 2,530 feet after having some good shows in the Frontier.

Carbon County

Sinclair Prairie Oil Co.'s No. 1, SE SE SW Section 29-27-89, on the Bunker Hill structure north of the Lost Soldier Field, was drilled to 6,791 feet and found the Sundance dry. It is plugging back to 6,165 feet to test the Dakota which showed oil and gas saturation in the cores.

Midwest Refining Co.'s No. 27 Union Pacific, NW SE SE Section 11-20-81, Elk Mountain, is rigging up rotary and is about ready to resume at 4,020 feet, at which depth the test has been idle since last winter. John Bartram, company geologist, is at the well.

Sweetwater County

Wyoming-California Petroleum Co.'s No. 1, Section 23-17-104, on the slope of Quakenasp Mountain, in the heart of the South Baxter Basin structure, has resumed after being shut down for the winter and is drilling at 3,400 feet. The Dakota is expected at 3,573 feet, but the test probably will be carried to the Sundance. It is a joint operation with Montacal Oil Co.

Sublet County

California Petroleum Corp. is resuming drilling operations in the La Barge Field after the seasonal shutdown and has made a location for its No. 6-L, SE SW Section 34-27-113.

Big Horn County

W. O. Taylor and others' No. 1 Hoskins, Lot 5, Section 25-56-97, Byron district, is building rig, and Lovell Dome Association's No. 1 Sheets, Lot 2, NE SE Section 9-55-96, has rig almost completed. Garland Syndicate's No. 1 Denio, Tract 43-C, Section 15-55-97, is drilling at 700 feet. This operation was taken over from Wisconsin Holding Co. at a depth of 600 feet.

MONTANA

Carbon County

Ohio Oil Co.'s No. 7 William Robinson (formerly No. 2), C SE SE Section 3-7s-21, Dry Creek, is drilling at 4,715 feet, below the second Frontier, which had a considerable show of oil and gas. Its No. 8 Caldwell (formerly No. 1), SE SW NE Section 12-7s-21, is drilling at 4,567 feet with the Dakota as the next objective. Ohio's No. 11 Bowman (formerly No. 1), C SE NE Section 4-7s-21, is spudding.

Carbon Oil & Gas Co.'s No. 1 Armstrong, SW cor. NW Section 7-7s-22, Dry Creek, failed to get a water shutoff and is recementing off bottom water. Its No. 1 McMinn, NW SW SW Section 7-7s-22, is shut down at 4,479 feet. It had a good show of gas in the second Frontier at 4,400-79 feet, but may be drilled deeper.

Ohio Oil Co.'s No. 1 Kuchinski, NW SE NE Section 15-7s-22, Golden Dome, total depth 6,660 feet, has plugged back to 5,000 feet, below the second Frontier, and will cement pipe and make a test of a show of oil and gas.

Glacier County

R. C. Tarrant's No. 1 Hogland, NW cor. SW Section 13-34-6w, Cut Bank district, is bottomed at 2,835 feet and fishing for tools and swedging pipe.

Milk River Petroleum Co.'s No. 1 Blackfeet, SW NE NE Section 28-36-12w, Milk River district, has rotary equipment on location. Total depth of hole is 2,956 feet.

Liberty County

People's Oil & Gas Co.'s No. 1 First National Bank, C SE NW Section 17-36-6e, Bear's Den, cemented off the 8¼-inch and is sidetracking at a total depth of 2,000 feet. Western Natural Gas Co.'s No. 2 Hicks, CWL NW NE Section 26-37-4e, Whitlash district, is rigging up.

Cascade County

Charles Merz and others' No. 1 Sheffelt, SE NW Section 4-21-4e, Black Horse Lake, is drilling at 1,325 feet. It is not planned to go beyond 1,400 feet.

Pondera County

Teton Corp.'s No. 3 Jones, C NW NE Section 17-27-4w, South Pondera, was completed in the pay at 2,008-24 feet for 40 bbls. per day. The Ellis contact was at 2,005 feet.

Toole County

Huso Brothers' No. 4 Levnick, C SW NW Section 27-35-3w, Kevin-Sunburst Field, topped the pay at 1,385 feet and is estimated good for 10 bbls. per day.

Oregon Oil Syndicate's No. 1 Barthelote, SW NE SE Section 20-36-2e, Barthelote district, is bottomed at 2,850 feet and is trying to pull the 8¼-inch to plug back and save the gas in the Colorado shale at 1,295 feet.

Askalta Oil Co.'s No. 3 Farbo, SE SW NW Section 2-37-4w, Buckley-Border Field, is drilling at 1,327 feet.

WASHINGTON

Ohio Oil Co.'s No. 1-A Robinson, Section 5-17n-9w, Aberdeen-Hoquiam district, Gray's Harbor County, is drilling at 450 feet.

SOUTH DAKOTA

Wy-Tex Oil & Gas Co.'s No. 1 Hamilton, Section 32-8n-1e, Oak Creek district, is ready to spud. Location was moved across the line into South Dakota from Crook County, Wyoming, so that it will be eligible for a reward of $25,000 offered by the State for the first commercial oil well.

Chadron-Osage Oil Co.'s No. 1 Moody Ranch, NE SW Section 6-12-6e, Fall River County, found the Muddy sand hard and chalky at 2,000 feet and is drilling at 2,160 feet.

VERNON S. SWISHER DEAD

OIL CITY, Pa., June 4.—Vernon S. Swisher, secretary and assistant treasurer of the Southern Group of pipe lines died here Tuesday, May 31, aged 63 years. Had he lived until June 11, he would have rounded out 49 years of service with Standard Oil Co. pipe lines.

Mr. Swisher was born in Mount Pleasant, Pa., August 27, 1868. He began his employment on June 11, 1883, with the National Transit Co. as a clerk and was soon appointed general shipping agent. He retained that position until the dissolution of the Standard Oil Co. in 1911 when he was transferred to the shipping and treasury department of the Southern Group Pipe Lines, comprising the Southwest Pennsylvania, Eureka, Southern and Cumberland Pipe Line companies. In 1922 he was named secretary and assistant treasurer of the Southern Group, a position he occupied at the time of his death.

Mr. Swisher was also a director of the Southern Pipe Line Co. and had at various times served as a director on the board of the Southern Group companies.

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Many Rigs Being Moved From Other Districts. Few Completions in Central West. Gibson County, Indiana, Has Good Well

By George A. Whitney
Staff Correspondent, Central West Fields

FINDLAY, Ohio, June 6.—In the Central West fields there were few completions from any part of the large territory covering the Lima, Central Ohio, Indiana, Illinois and Kentucky Fields, although there is a pickup in new work starting, especially in parts of Kentucky, where slight increases have been made in crude prices. Only one completion was reported from the Lima Field of northwestern Ohio, being C. A. and F. Peavey's No. 15 Elias Lewis farm, Section 1, Bath Township, Allen County, with an initial of 10 bbls. C. A. Peavey abandoned No. 9 E. W. Prowant farm, same section, and C. C. Apple pulled out old Nos. 8 and 19 on the J. W. Fetter farm, Section 21, same township.

In Auglaize County, the Ohio Oil Co. abandoned No. 2 John Fleck farm, Section 31, Noble Township.

Pember & Reydner are drilling on the Ray and Ellsworth Wagner farm, Section 27, Jackson Township, Wood County, and Wilber P. Hoobler has a rig in for No. 6 on the Mary Reitzel farm, Section 23, Perrysburg Township, same county.

It is reported that several new wells are to start in western Lucas County, in Monclova Township, west of Toledo, on the strength of the two wells recently brought in there, one for 25 bbls. on the Goldbrath farm, and one for 20 bbls. initial on the Solomon Betts farm.

CENTRAL OHIO

In the Central Ohio Field there were half a dozen completions reported, two being oil producers, three gas wells and one duster.

In the shallow sand area of Medina County Edson Sons Co. drilled in a 5-bbl. producer in No. 24 on the M. A. Shaw farm, Section 10, Chatham Township, and Curtis & Eakens found a dry hole in No. 6 Thomas Brown farm, Lot 24, at 400 feet, while the Edson well found its pay at 308 feet.

The Ohio Fuel Gas Co. drilled in a gas well in No. 1-5,569 on the Martin Talish farm, Lot 43, Strongville Township, Cuyahoga County.

F. A. Brendall and others brought in a gas well in No. 1 on the J. C. Young farm, Section 26, Jackson Township, Stark County, from 4,402-27 feet, the Clinton lime formation. Medford Oil & Gas Co. is drilling No. 2 Whitmyre heirs farm, Section 5, same township. East Ohio Gas Co. is drilling No. 4 Howard B. Fawcett farm, Section 17, same township.

In Wheeling Township of Guernsey County, the Ohio Fuel Gas Co. found a light gas well in No. 1-5,650 on the C. W. Martin farm, Section 3.

Co-operative Oil Co. and others report a 2-bbl. well on the Robert Nelson farm, in Vinton County.

In Belmont County, Gibson-Bradfield and others are drilling No. 1 Patterson heirs farm, Section 32, Somerset Township, and John Jefferies and others are drilling No. 1 George Butler farm, same section.

Capital Drilling Co. is drilling No. 5 Louis Little farm, Sections 32-33, Washington Township, Tuscarawas County. Hopewell Gas & Fuel Co. is drilling No. 3 Daniel Weaver farm, Section 10, Brush Creek Township, Muskingum County. Henry Garver is drilling on the H. Garver farm, Section 18, Killbuck Township, Holmes County.

INDIANA

Gibson County came to the front adding an excellent gas producer and a large oil well, while Pike County reports one good oil producer.

The Wabash Public Service Co. brought in a large gas well in No. 3 on the G. B. Allen farm, NE Section 22 Columbia Township, Gibson County, estimated at better than 5,000,000 feet. No. 2, same farm, drilled in a month ago showed around 16,000,000 feet. The Knox Engineering Co. is drilling close to pay sand in a second test on the Charles C. Steele, NE NE Section 22, same township. In Washington Township, same county, the Big Four Oil & Gas Co.'s No. 1 Nora Hope farm, NE Section 10, produced an initial of 175 bbls. Same company is drilling No. 3 Lottie Hope farm, SE Section 18, same township, and has a rig in for a second test on the Robert Huey farm, SE Section 18. E. C. Wharf is drilling on the F. R. Hope farm, Section 15, same township and county. Ohio Oil Co. abandoned Nos. 2 and 3 Lester Cunningham farm, along MD 116 and 121, same township, also Nos. 2 and 4 Sallie Cunningham farm, MD 117 and No. 1 Samuel Ford farm, MD 118, all in Gibson County.

In Pike County, Charles L. Divers' No. 3 Co. struck a 55-bbl. initial producer in No. 4 G. Robling farm, Section 14, Logan Township. P. C. Andrews is drilling No. 12 E. Loveless, same section.

Siosi Oil Corp. is drilling No. 21 on the William Riggs farm, Section 32, Prairie Creek Township, Sullivan County.

ILLINOIS

The only completion reported from the Illinois Field was by W. C. McBride, Inc., a test on the Raymond Oldham farm, Section 3, Montgomery Township, Crawford County, with an initial of 20 bbls.

Rhodes & Keith pulled out and abandoned their Nos. 1, 2 and 3 Daniel Morgan farm, in Martinsville Township, Clark County. Two other wells are drilling in this shallow area, Tilford & Morrow's No. 1 W. B. Johnson farm, Section 36, Casey Township, and A. M. Myers and others' No. 1 R. Endsley farm, Section 32, Westfield Township.

In the Dupo Field, Sugar Loaf Township, St. Clair County, L. G. Blackman and others abandoned No. 1 C. A. Phelps lot, Section 21; H. & M. Operating Co. abandoned Nos. 1 and 3 Pauline Eckert No. 3 lot, Section 34, and Hagerman & Weldon did the same with Nos. 1 and 2 on the Pauline Eckert lots, Section 34. Only two wells are drilling in St. Clair County, Cain & Pollock's No. 1 George Stolberg farm, Section 28, and Joseph May and others' No. 1 Theodore Stutz, Section 13, Millstadt Township.

In Petty Township, Lawrence County,

(Continued on Page 97)

Gas Tests in Northwestern Virginia

One Also in Southwestern West Virginia, All Close to Junction of Kentucky and Tennessee. Tests in Washington County, Ohio

By Staff Correspondent

PITTSBURGH, Pa., June 6.—A new development, in an attempt to locate new gas structures, south of known fields, has recently been started by Benedum & Trees in the southwestern part of West Virginia and the northwestern part of Virginia. In close to the junction of Kentucky, Tennessee, West Virginia and Virginia, these operators have started three tests. In West Virginia, on the waters of Long Branch in Big Creek district, McDowell County, these well known operators have a test drilling on the Pocahontas Coal Co. tract which has reached 1,600 feet. About 50 miles away and in Wise County, Virginia, on the waters of Guest River, in Charleston district, they have started drilling a test on the J. Kaufman farm which at present is fishing for tools at 208 feet. In a location in Washington County, Virginia, and on the waters of Holston River, Washington district, and forming about an equilateral triangle with the other two tests, they have a rig standing for a test on the J. M. Arnold farm. In West Virginia there is no gas field close by, and tests in contiguous counties to the north, east and west, have been disappointing. The logs of the new tests drilling may be correlated by recent developments in eastern Kentucky, and one or two tests drilled in Tennessee. These are probably the most interesting wildcat operations of the past several years.

Few wells were completed in the three districts of the Eastern fields during the past week. Four producers, one fair, and two gas wells formed the total, with the addition of seven dry holes. A few more wells are drilling, the greater part being work made necessary under leases. In line with the continued curtailment of the lower fields, action to continue a similar proration in the upper fields, based on contracts, has been announced. Until the curtailment is lifted, operators are loath to develop additional leases.

SOUTHEAST OHIO

The past week in Southeast Ohio ended with three producers and two dry holes. Tuscarawas County furnished the best completion in the lower fields. In Lot 32, Washington Township, Gordon Oil Co. No. 2 and others drilled a second test on the Martha Carroll farm in the Niagara lime to a depth of 3,695½ feet. It produced 30 bbls. the first day naturally, and in line with recent practice has not yet been shot.

In Medina County, F. Barnhard and others completed a test on the W. P. White farm in Harrisville Township, Lot 17, in the shallow sands at a depth of 473 feet. It produced 5 bbls. the first day after shot, extending this profitable shallow pool. In Chatham Township, of this county, E. R. Edson & Son Co. drilled No. 35 on the Morris A. and Eva Franks farm, Tract 16, Lot 20, to a depth of 470 feet, the Berea grit. It proved to be a dry hole.

In Morgan County, R. C. Whitener drilled a test on the S. L. and Joseph Finley farm, 1 mile west of Morganville, Section 3, Union Township. It was a shallow attempt and proved the First Cow Run sand dry at 190 feet. In Noble County, the Woodford Brothers completed a test on the George Woodford farm in the NE, Section 15, Olive Township. It reached the Buell Run sand at 90 feet and is making a showing for about a quarter of a barrel a day. It has not been shot, nor put to pumping.

Washington County Drilling

Four wells are still drilling in southeast Washington County, Ohio, but so far nothing has proved any new production, and the Crago test still continues to make about 30 bbls. a day in Section 11, Grandview Township. In the NW, Section 10, Independence Township, Eugene E. Grimm and others have reached a depth of 3,470 feet on the E. E. Knowlton farm and are close to the Speechley sand. Reports credit a better appearance of the formations, with a showing of better sand and not so much slate, in this test. It is stated that this test will be drilled to about 3,700 feet, and if nothing found, the casing may be pulled and the hole reamed for a start to the Niagara lime.

In the Penn Ohio Gas Co. test on the D. R. McKnight farm, NE, Section 10, Independence Township, the tools are in the Speechley sand, showing chocolate colored, at a depth of 3,570 feet. The same operators have reached 2,550 feet on the John G. Semmler farm, SE, Section 16, same township. The Warren formation is looked for about 500 feet deeper.

In the SE, Section 14, Independence Township, the Reno Oil Co. is making fair progress in the deep test on the James H. Goodman farm, having reached 1,500 feet and shut down running 6⅝-inch casing. This test is scheduled for the Niagara lime. The Buckley and McCall test on the Porter Pryor farm remains shut down and in the Ed Milden test on the William Barber farm, an offset to the Crago well, fishing for the tools has been discontinued. The depth of this test is 3,280 feet past the Warren formation.

In Marietta Township, Washington County, T. C. Robinson has a rig standing on the William Stewart farm. In Perry County, the Mid East Gas Co. is drilling on the Cecelia Snider farm, Reading Township, which is past the 2,000-foot level. In Tuscarawas County, the Hopewell Fuel Gas Co. is drilling on the Jess Dayton farm in Washington Township. It is drilling at 1,450 feet. In the same township, and Lot 32, the Capital Drilling Co. is rigging up on the Little and Swigert lease. The Gordon Oil Co. has a rig standing for No. 4 on the Ralph Huffman farm, Lot 35.

WEST VIRGINIA

Two gas wells and one small producer were completed in West Virginia. The producer was the test of H. M. Adams and others on the W. N. Ruckman farm in Jefferson district, Pleasants County. It is a very light producer in the formation at 600 feet, making but a fraction of a barrel a day.

In Cabell County, the United Fuel Gas Co. completed a test on the J. Frank Grass lease in Grant district at a depth of 2,054 feet. It is showing for a fair gas well. In Calhoun County, the M. & F. Oil & Gas Co. completed a test on the J. F. Allen farm in Lee district. It is an Injun sand gasser at a depth of 2,057 feet.

In Ritchie County, the Lewis Drilling

Corp. had a dry hole in its second well on the F. G. Sandy farm in Murphy district. In Roane County, W. B. Heeter drilled a test on the T. C. Burdette farm to 2,511 feet, the Berea sand, and it proved to be a dry hole.

In Tyler County, the Ohio Oil & Gas Co. drilled a test on the A. D. Arnett farm in Meade district. At 2,116 feet it proved to be a dry hole. In Wood County, and in the shallow sands of Walker district, G. C. Alleman Oil Co. tested the E. C. Linger farm through the Mitchell sand which proved to be dry. A similar result was obtained in the No. 8 Hugh Prather on the Pope lease, Walker district, which found the Mitchell sand also dry.

Drilling in West Virginia

In Lincoln County, there are but two wells drilling. In Jefferson district, the Cambridge Gas Co. is drilling a second test on the A. M. Mullens farm which is now 2,175 feet. In Carroll district, the United Fuel Gas Co. has reached 1,965 feet on the C. F. Vickers farm. In Union district, the Vernon Gas Co. is rigging up for a third well on the Roy and Hal Adkins farm. In Sheridan district, and in Carroll district, the Kanawha Gas & Utilities Co. has several locations prepared but has not commenced operations.

In Cabell County, C. C. Wolfe is nearing the sand on the J. F. Weatherington farm in Guyandotte district, the hole standing 2,045 feet. In this district, the Midway City Gas Co. has shut down at 1,530 feet in its test on the O. C. Morrow farm, same district, and is running casing. In the same district, C. C. Wolfe is building a rig on the T. H. Freeman farm, and is rigging up for No. 4 on the Ben Lomond Land Co. lease. In Barboursville district, the Merritts Creek Gas Co. has reached 2,300 feet on the Mount Terrace Land Co. tract, and is setting a drilling machine on the Ohio River Land Co. lease.

In Logan County, the West Virginia Gas Co. has reached 2,000 feet in No. 36 on the Dingess Run Coal Co. property, Logan district. In Chapmansville district, the Cumberland Petroleum Co.'s No. 7 on the Merrill Coal Co. lease is at 800 feet.

In Wayne County, the Penn Natural Gas Co. has reached 2,200 feet in a second test on the Guyan Valley Bank lease in Union district, and in the same district, the Southern West Virginia Gas Co. is shut down at 618 feet on the A. W. Preston farm.

In Boone County, C. P. Jones is drilling his second test on the G. T. Hill farm in Washington district and has reached 435 feet. In Sherman district, the Pure Oil Co.'s No. 57, on the Federal Coal Co. lease, has reached 2,261 feet. There is very little other drilling in this county or in the neighboring Kanawha County, though there are quite a few rigs standing, some rigged up, waiting orders, but gas in this section at present is more than surplus.

In Roane County, the Henderson Oil Co. has made fair progress on the F. L. Ball farm in Curtis district, the hole being 620 feet. In the same district, the Reedy Oil & Gas Co. is drilling on the Clyde and E. S. Guthrie farm, which has reached 1,240 feet. In Spencer district, O. E. Garrett and others are drilling on the Roy Hildreth farm. This test is past the 1,100-foot level.

In Gilmer County, James A. Tierney is rigging up for a second test on the F. G. Hardman farm in DeKalb district. There are no other operations in this county.

SOUTHWEST PENNSYLVANIA

In Southwest Pennsylvania, another week passed without adding anything to completions. More wells are drilling and some are about due in the sand. In Amwell Township, Washington County, J. C. Loustuller has reached 3,300 feet on the William Doak farm. In this township, the Philadelphia Oil Co. has started drilling its test on the John Kelsey farm, and the Union Gasoline & Oil Co. passed 500 feet on the H. B. Linley farm. In South Franklin Township, the Carnegie Natural Gas Co. is drilling on the T. Dickerson farm.

Crude Show Below Madison Lime

Possibility of Underlying Reservoir in Central Turner Valley. Southern Operators Agree on Voluntary Gas Conservation

By Victor Lauriston
Staff Correspondent, Canadian Fields

CHATHAM, Ontario, June 4—An important new development is reported in Central Turner Valley, where McLeod Oil Co.'s No. 4, LSD 16, Section 1-20-3w5, has encountered a show of crude oil in the Banff shales underlying the Madison limestone. Oil was struck at 5,860 feet, between 4 and 5 bbls. of 50 gravity crude being bailed; and drilling is continuing in the hope of developing commercial production. The discovery is important as indicating the possibility that the wet gas and naphtha of the Madison lime may be derived from an underlying crude oil reservoir.

McLeod's No. 4 was started several years ago and got a fair crude naphtha recovery from the top of the Madison at comparatively shallow depth, less than 4,000 feet. Later, the hole was deepened to restore production, and at about 1,250 feet in the lime a second crude naphtha horizon was discovered, from which a steady production of about 25 bbls. a day was taken for a considerable time. When this flow declined, it was decided to deepen the hole still further for exploratory purposes.

The drill left the Madison and entered the Banff shales at about 5,560 feet and has since been drilling in the shale, which has been penetrated about 300 feet. At the present depth, the test is about 1,900 feet below the top of the Madison. The Banff shale horizon is previously untested in this part of Alberta. It is of Mississippian age, and is thought to be related to the Devonian limestone series which generally underlies the Madison.

McLeod's No. 4 was the first well in the Turner Valley to be carried through the Madison into the underlying formation. The location is in the heart of the Central Turner Valley area, the McLeod company having drilled five tests in LSD 16. All five tests were carried to the crude naphtha horizon in the Madison. In most of the wells, light crude was encountered in the upper horizons, and in the Madison wet gas and crude naphtha, with a good initial production which later declined considerably.

Will Test Theory

It is expected that deepening of McLeod's No. 4 will test the theory held by many operators that the crude naphtha and wet gas of the Madison is derived from an underlying reservoir of heavier crude. Crude oil had previously been encountered in the Madison lime itself in two wells, Model's No. 1 in North Turner Valley, where the structure is modified by a fault, and Miracle's No. 3 in South Turner Valley; but in the central field the production in the lime has been naphtha recovered from the wet gas by separators. The McLeod company was one of the pioneer operators, having started operations several years before the naphtha horizon was discovered; and McLeod's No. 1 was one of the earliest wells to drill to the naphtha horizon after the completion of Royalite's No. 4, the discovery well.

McLeod's No. 1, LSD 16, Section 1-20-3w5, has finished cleaning out and deepening in the Madison, with considerable improvement in wet gas production.

Central Turner Valley

In the Central Turner Valley area, Canada Southern's No. 3, LSD 16, Section 1-20-3w5, is reported standing in the lime at 4,500 feet. The test is about 700 feet in the lime, with a fair wet gas production, but may later be deepened to the Banff shale horizon if McLeod's No. 4 proves the latter to be commercially productive.

Shareholders of British Dominion Oil & Development Corp. elected the following officers and directors: President, J. H. Goodwin; vice president, Dr. M. C. Costello; secretary, Hardie Turnbull; directors, Dr. R. M. Cook, W. Matthew, A. H. Goodal, of Calgary; T. Langley Webb, London, England. The company has one deep producer, British Dominion's No. 2, in LSD 6, Section 12-20-3w5, with an unrestricted production around 30 bbls. a day. No new drilling is contemplated in the immediate future.

South Turner Valley

In the South Turner Valley, Miracle Oils' No. 3, LSD 11, Section 4-19-2w5, is reported standing at 6,150 feet and taking some crude oil production from the Madison lime pending a decision as to deeper drilling.

In the far south, Mar-Jon-Freehold's No. 1, LSD 9, Section 28-18-2w5, has resumed drilling at 3,570 feet after changing to rotary, and is reported making hole below 3,640 feet. Union Drilling Co. of Calgary is handling the contract. A. H. Mayland has started work on Rand Petroleums' No. 1, LSD 5, Section 34-18-2w5; water shut off has been made at 300 feet and is being tested before drilling deeper.

Turner Valley Conservation

Though Spooner Oils, Ltd., and Richfield Petroleums, Ltd., having secured injunctions restraining the Turner Valley Gas Conservation Board from restricting the gas flow from their wells, announcement is made by Frank P. Fisher, the board's technical advisor, that operators in the south half of Turner Valley Field, representing about 87 per cent of the crude naphtha production, have voluntarily agreed to conserve the gas flow. The area covered by voluntary agreements is south of the line of Township 19, and at last reports all the companies except one, which had not given a decision, were observing conservation. Subsidiaries of Imperial Oil, Ltd., and independent operators are both represented among the companies concerned.

A third test case has been started against the conservation board by New McDougall-Segur Oil Co. to determine the rights of operators holding oil and gas leases direct from the crown. The holdings of Spooner Oils, Ltd., and Richfield Petroleums, Ltd., the companies which instituted the previous test cases, were leased from private parties, so that they were in a somewhat different legal position. The Spooner Oils case will come up for trial before the Alberta Supreme Court at Calgary, but the Richfield Petroleums and New McDougall-Segur cases will, it is expected, be allowed to stand pending the result of the Spooner test case.

Pending the result of the litigation, which may be carried to the Imperial Privy Council for final decision, the conservation board will proceed with the work of testing the gas flow in various parts of the field. This work is not interfered with by the interim injunction.

The result of the test cases now in progress is expected to have an important bearing on the rights of Canadian provinces generally to restrict oil and gas development operations in the interests of conservation.

Reserve Dome Gas

On the Alberta end of the international Reserve Dome structure, east of Coutts, Mayland Syndicate's No. 1, LSD 13, Section 4-1-9w4, recently resumed drilling after the winter shutdown at 2,750 feet and is reported making new hole below 2,870 feet. Further gas has been encountered, considerably increasing the previous aggregate of about 10,000,000 feet a day from several different horizons. Unlike the gas from the upper horizons, the new production is a sulphur gas. Drilling is being continued for oil, which is looked for around 3,100 feet. Several other companies hold extensive acreage adjacent to the Mayland Syndicate leases, and will drill if commercial oil production is secured in this well.

Border Fields

On the Twin Dome structure, southeast of Lethbridge, Parco Oil Co.'s No. 1, LSD 16, Section 34-1-20w4, has been shut in. An early test after pressure had been built up to 800 pounds gave a flow of 15 bbls. a day from the Madison lime; but a later test gave only about 5 bbls. Two successive shows have failed to materially increase the initial production.

Red Coulee Field

In the Alberta end of the Red Coulee Field, D. A. McDonald and associates of Vancouver are reported rigging up to resume work on the Ko-Tops well in Section 2-1-17w4. The test has been standing unfinished for several years, and is on the west side of the field.

On the Montana side, Askalta Oils' No. 3 Farbo, SE NE Section 2-37-4w, is reported drilling below 1,600 feet. The Askalta company is reported delivering around 8,500 bbls. a month to the Northwestern Stellarene refinery at Coutts from its wells in the Red Coulee Field.

East-Central Alberta

In the Viking gas field, east-central Alberta, Northwestern Utilities' No. 24, is reported drilling below 1,760 feet. When this test is finished, the rig will be moved to No. 25, in the same district.

In the Kinsella Field, Northwestern Utilities' No. 2 Harvey, the first test by this company in the new Kinsella gas area, is drilling below 360 feet. No. 1 Harvey will be spudded in as soon as No. 2 is completed.

Tests in the Foothills

In Waterton Lakes Park, Patrick-Spence Oil Syndicate's No. 1 will start work on Cameron Creek as soon as the parks department opens the Akamina highway for traffic. Drilling outfit has been purchased for the test, and equipment is reported ready to move in. Thomas Visser of Okotoks is reported to have the contract for building the rig. The location is near Oil City, and immediately east of the original discovery well in this area, which some 30 years ago got a substantial production of high-grade crude at a reported depth of 1,020 feet. It is expected drilling will start some time in June. L. Morrow of Waterton has the contract for building a road from the highway to the location, and a contract has also been let to James Cropley of Waterton for 60 cords of wood per month for fuel. Location is in Section 30-1-30w4.

Report on Waterton Prospects

A report made some time ago on this area by Dr. John A. Allan of the University of Alberta indicates fair prospects of commercial crude. The report is in part as follows:

"These holdings are situated at Oil City, 25 miles west by southwest of Pincher Creek and 5 miles north of the international boundary line. Oil Creek, which flows into the Waterton Lakes, cuts through both sections (Sections 30 and 32, Township 1-30w4). This property is behind the front or outermost range of the Rocky Mountains bordering on the Great Plains.

"The district is truly mountainous, the ridges and mountains extending from 2,000 to 3,000 feet above the bottom of the valleys. Since the sides of Oil Creek Valley are quite steep, the only areas that can be profitably explored for oil are those immediately joining Oil Creek.

"That crude exists under this district has been definitely proven by the wells put down by the Rocky Mountain Oil Co. in Section 30 and also the Western Coal & Oil Co. in Section 23, both in Township 1-30w4. From one of the wells drilled a few years ago by the Rocky Mountain Oil Co. there has been reported a daily production (initial) of at least 125 bbls.

"There are also numerous oil seepages in the district. I visited one seepage in an adjoining section where the crude black oil was dropping from the shaly rocks; the oil had thoroughly saturated the rock debris on the hill slopes. In Section 32 other strong seepages of black oil were observed. The gravels on the side of Oil Creek at the locality are heavily saturated with these petroleum products. For some years these oil seepages were collected and profitably exported to the plains for cattle dipping purposes.

"The oil seepages in the district are by far the strongest indications of oil that are known to occur in Alberta. The most favorable part of Sections 30 and 32 is that situated on or quite close to the edge of Oil Creek. In other portions of these sections the limestones are too thick to attempt to drill through them. These sections are quite favorably located so far as the geological structure is concerned. The presence of numerous seepages of the crude oil in the vicinity of Oil Creek and the fact that black oil has been obtained by drilling in Section 30 leads me to state that there is an oil reserve beneath the district and that your company has a reasonably good chance of getting it by drilling in the location mentioned above."

Alberta Production in April

Crude oil and crude naphtha production from Alberta wells in April, according to figures issued by the provincial mines and lands department, totaled 84,444 bbls. The Turner Valley production was given at 80,708 bbls., of which 78,849 bbls. was crude naphtha. The Red Coulee Field produced 3,115 bbls. of light crude, and the Wainwright Field 621 bbls. of heavy crude.

Manitoba Gas Test

In the Manitou district, southwestern Manitoba, Commonwealth Petroleums' No. 2, LSD 2, Section 26-2-9-wPM, is standing at 1,917 feet and preparing to run 4¾-inch casing to bottom before going deeper. Shipment of 2,200 feet of casing is being brought in.

British Columbia Operations

In the Kelowna district, British Columbia, Okanagan Oil & Gas Co.'s No. 1, Section 2-26-Osoyoos Survey, is standing at 2,520 feet and waiting for casing. It is planned to shut off water and test oil and gas production at this depth.

Operations in Ontario

In the D'Clute Field, Kent County, Ontario, Union Gas Co.'s No. 20, Lot 21, Concession 10, Raleigh Township, has been finished as a small gasser. The test was drilled to 1,890 feet, with a number of small gas pays between 1,500 and 1,600 feet. It was plugged back to the latter depth and shot with 600 pounds of dynamite, finishing with a shot production around 100,000 feet a day. A second test may be drilled in this area, though no new location has yet been made.

In the Dawn Field, Lambton County, Union Gas Co.'s No. 61 NW Lot 23, Concession 2, Dawn Township, is reported drilling at 1,640 feet.

In the Petrolia-Enniskillen Field, Lambton County, the pumping rig on the J. E. Armstrong oil property several miles southeast of Petrolia was destroyed by fire, apparently due to pulley friction. The central pumping plant operated upwards of 20 shallow pumpers. It is reported that George Bryson, who recently returned from a drilling contract in Borneo, may take over and refit the property.

Wainwright-West Meeting

Shareholders of Wainwright-West Oils, Ltd., held their annual meeting this week in Toronto, when the following directors were elected: P. D. Bowlen, managing director; M. I. Waters, secretary-treasurer; H. M. Snyder, Col. W. H. Sharp, Thomas Ramsay, John R. Shaw.

CENTRAL WEST FIELDS

(Continued from Page 95)

the Ohio Oil Co. abandoned Nos. 7 and 10 on the S. E. Hazel farm, SE NE Section 19, and No. 4 on the Samuel Gowin farm, NW Section 25, same township.

KENTUCKY

The Owensboro Field is showing a revival in development work, as there are reported to be many rigs being moved to locations in Ohio, Daviess and Muhlenberg Counties, more outfits than have been working in those counties for months. The price of crude is $1.05 at the wells, and it looks brighter than for a long time. The bringing in of a big well by Bolling & Hume on the Dave Christian farm, in the Haynesville area of Ohio County that showed an initial of 150 bbls. at 335 feet has brought about a rush for locations and nearby leases. The Cumberland Petroleum Co. will start an offset to the Christian on the Dave Brooks farm, and the Louisville Gas & Electric Co. will also offset on the Miller farm. No. 2 Dave Christian farm, for Bolling & Hume, is drilling.

McLean County is attracting some attention at this time, due to the recent completions made by Paul Goldberg and others on the Roy Owens lease, in the Barrett Hill area of the county, reported with an initial of 400 bbls. at a depth of 1,000 feet. Miller & Shiarella are drilling an offset to the Goldbrath well and on the Smith farm, between Barrett Hill and Jolly Pools. Hupp & Duff drilled a dry hole on the Homer Johnson farm, in the Barrett Hill Pool, and the First Owensboro Bank & Trust Co.'s No. 3 well, 400 feet from the north line and 800 feet from the east line of the Edward Sommers farm, in the Grindstone Hill area, 2 miles north of Calhoun, shows a light gas volume at a depth of 1,464 feet.

In Daviess County, Owensboro Field, Ellis and Ashby are reported drilling No. 2 E. R. Cooper farm, in the Jones Pool, also starting No. 3 same farm. Cox and others are starting No. 3 Alsip farm, in the Cane Run area, and Brenner & Adams are starting No. 3 L. P. Williams farm, while Hupp, Garrison and others are reported starting No. 2 J. Richardson farm, Cave Run Pool. S. M. Sherman is reported starting Nos. 3 and 4 J. T. Mayfield farm, in the Red Hill Pool, Daviess County, and Mida McMahan is also starting No. 4 Robert Jones farm, in the Jones Pool.

In Ohio County

In Ohio County, D. T. Bolling and others' test in the northwest corner of the John Christian 100 acres, in the Haynesville Pool, found 44 feet of sand at a total depth of 335 feet. D. J. White and others' No. 4 well, 480 feet from the north line and 200 feet from the west line of the Ernest Bickett 90 acres, in the same pool, is reported for 25 bbls.

In McLean County, Barrett Hill area, Fred Weir and others drilled a dry hole in the Himes lease, and Maple & Lyle also struck a duster on an unknown farm, in the same part of the county. Trout, Cameron and others are drilling a second test on the R. A. Baughn farm, same county.

Marked activity is being shown in Muhlenberg County, evidenced by the securing of leases sought on lands and the numerous trucks carrying pipe and tanks into the field a short distance from Greenville, the county seat. In this county Ellis & Young drilled in a 15-bbl. pumper in No. 1 on the H. F. Lee farm, near the hamlet of Weir, but also struck a dry hole on the Mary Corneal farm, same area.

Butler County, long neglected by the oil people, is coming in for an active play. During the last couple of weeks considerable leasing has been reported and a number of tests will be made within the near future which are being eyed with a great deal of interest by local oil men. A lease of over 10,000 acres has been taken by Yewell & Hildebrand near Morgantown and Mining City, and George Staves, local oil well contractor, will start moving a rig on location. Roy Hogan has under lease a block of 6,000 acres near Dimple, in Butler County, and will also start drilling.

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Californians May Get Higher Prices

Only Thing in Way Is Failure of Some Operators to Get Into Line With Curtailment. Long Beach Worst Offender

By L. P. Stockman
Staff Correspondent, California Fields

LOS ANGELES, Calif., June 4.—A further substantial reduction in crude oil production was effected by California operators the past week, although the average for the period was somewhat above the maximum daily allotment of 476,700 bbls. For three days during the early part of the week, production dropped below the objective but later bounded up to 477,383 bbls. and then increased to 490,166 bbls. per day. Operators in the Long Beach Field continued to jeodardize the new proration program by failure to curtail production to the district's allotment of 67,000 bbls. per day. Production of this field is still averaging around 76,000 bbls. daily. This short-sighted policy, unless immediately corrected, will retard the advent of higher prices, which will certainly materialize if production is cut back to current requirements.

Umpire Neal Anderson, the executive committee and the Operators Central Committee on Proration, buoyed up by the hope that an early increase in prices can be anticipated upon completion of the new proration program, are making a concerted attempt to convince operators in the Long Beach, Playa Del Rey and Huntington Beach Fields that their cooperation is imperative to the success of the new curtailment program. It is rather surprising that operators in these fields are reluctant to make the final curtailment necessary to assure the success of the new proration program, especially since the excess could be removed without imposing any great hardship on individual operators. As the situation stands at present, Long Beach operators have no one to blame but themselves if the existing conservation program fails. The attitude of several independent refiners has had a direct bearing in influencing the decision of Long Beach operators with respect to curtailment. These refiners, who for the most part are buying uncurtailed oil, are not in sympathy with curtailment work, and are consequently in a position to induce operators to produce wide open. The seriousness of this situation lies in the fact that unless Long Beach operators curtail production the possibility of an early increase in prices appears rather remote. It is quite evident that marketers would be unable to maintain a schedule of higher prices for refined oils if irreconciliables at Long Beach continue to produce without restraint and subsequently sold this production to independent refiners, who would in turn cut prices and ultimately undermine the general price structure. This is particularly important in view of the fact that the industry on the Pacific Coast is facing the possibility of a lower consumption during the current year.

The Executive Committee for Equitable Proration of Production has decided to make no change for the present in California's allotment of 476,700 bbls. per day and Umpire Neal Anderson has accordingly issued new schedules for the month of June which contemplate a reduction in production to the maximum allowable set by the Executive Committee. Although no change was made in the state's allotment, California's potential daily production estimate was reduced from 1,062,750 bbls. to 1,018,200 bbls., a decrease of 44,550 bbls. per day from the potential established May 23. San Joaquin Valley fields experienced the heaviest reduction in estimated potential, declining from 539,230 bbls. per day to 502,500 bbls. daily. The potential of Kettleman Hills was cut back from 285,000 to 250,000 bbls., a net reduction of 35,000 bbls. per day. Los Angeles Basin fields were reduced 8,700 bbls. per day, the potential having been reduced from 400,400 bbls. to 391,700 bbls. per day. Fields in the Coastal area, in contrast with reductions made in San Joaquin Valley and Los Angeles Basin fields, were stepped up 880 bbls. per day, giving this district a potential daily production of 124,000 bbls. Under the new setup, San Joaquin Valley fields are expected to reduce production to 168,500 bbls. per day, the Coastal district to 62,500 bbls. daily and Los Angeles Basin fields to 245,700 bbls. per day. These allotments remained unchanged, despite the reduction made in the state's potential production.

Kettleman Hills

Although completions in the Kettleman North Dome Field have been infrequent during the past few months, operators are expected to make up for lost time during the next 60 days as several wells are expected to be finished within that period of time. No. 4 Huffman of the Superior Oil Co., which has just been cemented at 8,600 feet, is scheduled to be the next completion in the North Dome. This well, which is somewhat deeper than No. 1 Huffman, bottomed at 8,323 feet, or Nos. 2 and 3 on the same lease at 8,320 feet and 8,490 feet respectively, should be tanking oil within the next 10 days. Nos. 2 and 3 on the Huffman lease have been shut in for several months because of curtailment work, and No. 1 Huffman has been beaned down to 3,850 bbls. of clean 36.3 gravity oil and 5,950,000 feet of natural gas per day. These three wells are each capable of producing approximately 10,000 bbls. per day and it is believed that No. 4 Huffman will at least equal this average well production.

The Kettleman North Dome Association, which is drilling ahead in six potential producers, is also expected to finish a new well in the near future. As a matter of fact, the Association has three wells within 500 feet of completion and should finish all of them before the close of June, unless something unforeseen develops in the meantime. Three other wells of the Association are rotating ahead below the 7,500-foot level and under normal conditions should be finished some time during July. No. 58-20-J of the Kettleman North Dome Association, located out in the extreme western part of the North Dome, is rotating ahead in the Temblor at 8,550 feet and looks good for early completion. The North American Oil Consolidated's No. 1 Elsinore, at 9,578 feet is being reamed preparatory to the landing and cementing of 5-inch casing for a production test. This well, located rather far out on the north flank, is 78 feet deeper than No. 1 Blauvelt, which has been standing suspended for several months at 9,500 feet.

The North Kettleman Oil & Gas Co.'s No. 1 Lillis Welsh, the most westerly well to be drilled in the North Dome at the present time, is approaching the 5,700-foot level and is expected to land a string of 13⅜-inch casing in the near future. This well has not yet picked up the brown shale but should do so shortly. It is the most important test under way in the North Dome at present because it will extend the proven limits of the field for more than 2 miles if commercial production is developed. Because of its importance from an exploratory standpoint, several companies interested in that section of the field have put up dry hole money which will be paid out of production if the well is a producer. The Standard is rotating ahead in its No. 6-29-V in the Kettleman Middle Dome Field at 8,200 feet. This well will probably be carried on down to somewhere around 9,000 feet before another production test is made. No. 1 Burbank of the Petroleum Securities, which revealed the probable existence of a substantial accumulation in the Kettleman Middle Dome Field, is still held up with mechanical trouble. The Universal Consolidated spudded in No. 1 Bunting, a third test to be drilled in the Middle Dome, and the bit has just passed the 1,000-foot level.

Lost Hills-Belridge

The Belridge Oil Co. is expected to make another production test on its No. 64-27, a deep project in the North Belridge Field of Kern County, some time during the next week or 10 days. It is the present intention to set a liner in this deep well, bottomed at 8,056 feet, and make a conclusive test. It is one of the most important drilling projects in the San Joaquin Valley because, if commercial production is secured, it may ultimately result in the drilling of several deep tests in other San Joaquin Basin fields. Very little information is available as to the geological status of this well due to the fact that the company has clamped down the lid on the release of all data. The well staged a short demonstration a few weeks ago when it blew in flowing approximately 50,000,000 feet of gas per day. In addition to this deep test, located in Section 27-27-20, the Belridge Oil Co. is working on one other well in this field located in Section 35-27-20. There has been no change in the status of wells in the Lost Hills Field, as all of the wells suspended last year are still on the idle list.

Fruitvale

Three new wells were started in the Fruitvale Field of Kern County during the past week and, judging by the number of new rigs going up, additional work may be anticipated. The Western Gulf Oil Co., discoverer of the Fruitvale Field, has just spudded in No. 1 Bittle and is now running three strings at Fruitvale. The Bankline Oil Co. spudded in its second well several days ago and is at present working on two projects, in as much as No. 1 has failed to result in a natural flow and may have to be put on the pump. The Mohawk Petroleum has concluded drilling operations on its well No. 10 in this field at 4,104 feet and this well should be on production within the next day or so.

The Round Mountain Field of Kern County is showing a little revival of work due to additional activity of the California Western Oil Co., Chanslor-Canfield Midway Oil Co. and the Kern Petroleum Corp. The Chanslor-Canfield interests have just spudded in No. 1 Coffee, an outpost in Section 1-28-28, and the California Western Oil Co. is erecting two new rigs. There was no great change in the amount of drilling in the Mount Poso Field during the week, although one new well is expected to be started within the next 10 days. The Republic Petroleum has found it necessary to redrill its No. 35-A in the Midway-Sunset Field of Kern County due to a crooked hole. Fred Turner and Goldman & Simms have started rig construction for new wells to be drilled in this field.

Buttonwillow

The Milham Exploration Co. has succeeded in completing its well No. 41-7 as a commercial gas producer in the Buttonwillow Gas Field of Kern County. This new well, bottomed at 2,573 feet and finished with a 6⅝-inch liner, failed to come in on a production test at this depth, but was ultimately completed flowing 18,000,000 feet of dry gas per day after the 8⅝-inch casing was perforated from 2,160 feet to 2,287 feet. The well was shut in immediately subsequent to completion and shows a casing pressure of 960 pounds at the present time. The Milham, discoverer of the Buttonwillow Field, spudded in No. 32-7 immediately subsequent to the completion of No. 41-7. The Graham & Loftus Oil Co. has definitely abandoned No. 1 Carmel, located in this general area in Section 20-27-22 at 6,605 feet. No. 1 Morris of the General Petroleum and No. 1 Salisbury of the Wilshire have been suspended at 3,095 feet and 7,000 feet respectively. The Barnsdall's wildcat in the Wheeler Ridge section, located in the extreme southern part of the San Joaquin Basin, is getting quite deep and, while this well still has a chance of developing commercial production, the outlook is not any too favorable at 6,801 feet. The Rio Grande Oil Co. is making fairly good footage in No. 1 Utting, a test which the

TANKER SHIPMENTS FROM LOS ANGELES TO DOMESTIC AND FOREIGN PORTS

	Total this week	Daily average	Total last week	Daily average	This year to date	Same time last year
Intercoastal-Domestic—						
Diesel and gas oil	.....	.....	.....	.....	116,890	892,220
Gasoline	112,985	16,141	229,554	32,793	3,865,517	6,269,739
Kerosene	.....	.....	.....	.....	103,895	41,512
Foreign exports—						
Crude oil	299,327	42,761	126,522	17,260	3,532,529	2,763,067
Fuel oil	121,660	17,380	86,177	12,311	2,302,841	6,209,147
Diesel and gas oil	39,112	5,587	92,413	13,245	946,589	1,503,688
Gasoline	3,539	506	174,590	25,513	2,771,153	4,028,972
Kerosene	86,545	12,364	.....	.....	921,952	896,136
Lubricants	.....	.....	.....	.....	.....	18,978
Naphtha distillates	.....	.....	.....	.....	75,425	.....
Coastwise-domestic—						
Crude oil	176,831	25,262	314,384	44,912	5,618,165	3,663,364
Fuel oil	148,322	21,189	155,949	22,281	6,438,236	5,691,586
Diesel and gas oil	20,382	2,940	19,254	2,751	636,149	737,718
Gasoline	508,071	72,582	344,402	49,200	6,390,588	5,192,061
Kerosene	7,128	1,018	4,792	685	75,475	157,628
Naphtha distillates	.....	.....	.....	.....	.....	4,662

TANKER SHIPMENTS FROM SAN FRANCISCO TO DOMESTIC AND FOREIGN PORTS

Intercoastal-domestic—						
Diesel and gas oil	.....	.....	.....	.....	151,320	.....
Gasoline	.....	.....	.....	.....	292,455	338,719
Lubricants	.....	.....	.....	.....	15,824	14,015
Foreign exports—						
Crude oil	.....	.....	.....	.....	635,426	77,556
Fuel oil	.....	.....	.....	.....	521,659	515,395
Diesel and gas oil	.....	.....	.....	.....	252,107	232,282
Gasoline	169,410	24,201	.....	.....	1,550,326	1,604,329
Kerosene	110,451	15,779	.....	.....	450,493	409,142
Lubricants	4,050	579	.....	.....	24,934	.....
Coastwise-domestic—						
Fuel oil	64,310	9,187	156,985	22,426	1,162,749	1,757,502
Diesel and gas oil	.....	.....	9,177	1,311	196,281	158,642
Gasoline	42,177	6,025	7,411	1,059	1,366,122	1,176,406
Kerosene	.....	.....	.....	.....	44,285	115,941
Naphtha distillates	.....	.....	.....	.....	.....	49,750

company is drilling in the Shale Hills, but it will probably be another several weeks before the well is deep enough to prove of more than passing interest. The Fullerton Oil Co. has abandoned another structure survey hole in the Semitropic district of Kern County and is rigging up its seventh core hole to be drilled in Section 1-27-22. In the McKittrick Field of the San Joaquin Valley, the Welport Oil Co. is cleaning out one test in Section 26-29-21 and has just spudded in another in Section 19-29-21.

Inglewood

The Baldwin Oil Co. has decided to redrill the last 550 feet of hole in No. 9 Brownmoor in the Inglewood Field of Los Angeles Basin before making a production test. This well, an outpost bottomed at 4,160 feet, has encountered an oil sand of undetermined productivity but of sufficient importance to justify the making of a production test. Due to its position on the structure, this well is not expected to show substantial production as other wells located nearer the axis did not show large production. The Pacific National Oil Co. has decided to resume drilling operations in No. 5 Baldwin and this hole is being deepened in an effort to pick up one of the lower virgin zones in this field. No. 5 Baldwin, a former upper zone producer, is rotating ahead at approximately 4,600 feet at present. The Pacific Western Oil Co. has spudded in No. 16 Rubel in the Inglewood Field, and, while the company has not announced the probable completion depth of this well, it will probably be finished in the second zone. Operations of the Pacific Western are regarded as of a routine nature only and will consequently not precipitate a deepening campaign in this field.

The Shell Oil Co. is reaming No. 43 Reyes, bottomed at 4,574 feet, and will suspend drilling operations on the completion of this well some time during the next few weeks. The Union Oil Co. failed to effect a satisfactory water shutoff in No. 18 Hellman, another incompleted drilling well in the Dominguez Field, and is fishing for liner preparatory to making another cement job. The Associated's No. 5 De Francis in this field has proven somewhat of a disappointment upon completion at 4,500 feet, as the output, 35 bbls. per day, is cutting about 30 per cent. No. 3 De Francis, at 5,111 feet, is expected to be deepened if the company succeeds in pulling the tubing which twisted off at 4,336 feet. The Republic Petroleum is rotating ahead in a gray oil sand in No. 1 Childs at 4,991 feet and will probably make a production test some time during the next few weeks. The Continental Oil Co. has just spudded in No. 34 Bixby, a new well in the Seal Beach Field of Los Angeles Basin, and this project, an offset to No. 25 San Gabriel of the Standard, will be drilled down to approximately 6,000 feet for completion. The Standard has shut in No. 25 San Gabriel, a recent completion, in order to reduce production in conformity with the new curtailment program, but is drilling ahead in No. 12 San Gabriel at 6,285 feet in what looks to be a fairly promising oil sand. The Wilshire Oil Co. is working on four wells in the Potrero Field of Los Angeles Basin, three of which are located on the Potrero Country Club property. Some are inclined to believe that the Wilshire is playing with dynamite in drilling three wells on this lease simultaneously. This opinion is predicated on the assumption that few wells in the Potrero Field will pay out due to lack of gas pressure and the small amount of oil sand present. The Associated Oil Co., after paying a substantial bonus to secure a lease on the Potrero Country Club property several years ago, subsequently pulled out after drilling a few wells which failed to produce sufficient oil to pay for the cost of drilling. The Wilshire is obliged to maintain a consistent development program in this field in conformity with lease requirements and, while preparations were made a few weeks ago to start a fourth well on the Country Club property, the company suspended further work after making grade for the new rig.

The Standard, instead of carrying No. 51 Emery down to the deep zone in the West Coyote Field, decided to finish this project in the upper zone at 4,218 feet. A 6⅝-inch liner carrying 295 feet of perforated, was accordingly landed on bottom and the well brought in pumping 164 bbls. of 26.1 gravity oil cutting 10 per cent. The completion of this well finished the Standard's development program in the West Coyote Field, but preparations have subsequently been made to start two new wells, Nos. 111 and 112 on the Murphy Coyote property.

Santa Fe Springs

Although drilling operations in the Santa Fe Springs Field have been a negligible factor during the past year or so, there have been a number of reconditioning jobs undertaken during the past several months. There is a very definite disposition on the part of operators to plug back from the lower to the upper horizons due principally to depletion of the deeper zones. During the past few months six wells have been plugged back from the Hathaway to the Meyer zone, two wells from the O'Connell to the Buckbee zone, one well from the Clarke to the O'Connell zone, one well from the Buckbee to the Meyer, one well from the Clarke to the Meyer and one well from the Hathaway to the Buckbee zone. It will be noted that eight of these twelve wells were plugged back to the Meyer zone.

The six wells plugged back from the Hathaway zone to the Meyer zone include Nos. 1 and 2 on the Ratliff lease of the Ring Petroleum Corp., No. 25 South Whittier Community and No. 11 Koontz of the Standard, No. 1 Lamb of the Third Twin Bell Syndicate and The Texas Company's No. 11 Patterson. No. 1 Ratliff, plugged back from 7,950 feet to 4,551 feet, was recompleted pumping 285 bbls. of relatively clean 34.1 gravity oil per day, while No. 2 Ratliff, plugged back from 8,000 feet to 4,572 feet, was returned to production pumping 135 bbls. of 33.9 gravity oil cutting 5 per cent. No. 25 South Whittier Community of the Standard, plugged back from the Hathaway zone at 7,920 feet to the Meyer zone at 4,594 feet, was recompleted pumping 60 bbls. of 38.1 gravity oil cutting 35 per cent water. The Standard's No. 11 Koontz, plugged back from the Hathaway zone at 7,991 feet to the Meyer horizon at 4,601 feet, was recompleted pumping 110 bbls. of 35.4 gravity oil cutting 20 per cent water. This well was originally completed flowing 1,350 bbls. per day from the Buckbee zone at 5,798 feet in January, 1929, and recompleted in the Hathaway zone in September, 1929, after being redrilled and deepened to 8,047 feet, and subsequently plugged back to 7,990 feet.

The Third Twin Bell Syndicate's No. 1 Lamb has produced from three zones in this field up to the present time. It was originally completed in the O'Connell zone flowing 1,510 bbls. per day from 6,492 feet in May, 1929. In December, 1929, the well was redrilled and deepened to the Hathaway zone and brought in flowing 2,855 bbls. per day from 8,072 feet. Due to depletion of the Hathaway zone, the well has now been plugged back to the Meyer horizon at 4,610 feet and was recompleted a few weeks ago pumping 220 bbls. of 38.2 gravity oil per day. No. 11-B Patterson of The Texas Company, originally completed flowing 1,380 bbls. per day from the Hathaway zone at 7,947 feet in November, 1929, was recently plugged back to the Meyer zone at 4,525 feet and recompleted pumping 258 bbls. of 33.4 gravity oil cutting 10 per cent.

The General Petroleum's No. 187-B Hill has produced during its life to date from the Buckbee, Clarke, Hathaway and Meyer zones. This well was originally completed in January, 1929, flowing 4,260 bbls. per day from the Buckbee zone at 5,880 feet. In January, 1930, it was redrilled and deepened to the Clarke and Hathaway zones at 7,996 feet, from which depth it was brought in flowing 3,310 bbls. per day. In January, 1931, the well was plugged back to the Buckbee zone at 5,727 feet and recompleted doing 969 bbls. per day. It was recently plugged back to the Meyer zone at 4,485 feet and recompleted pumping 100 bbls. of 34.5 gravity oil cutting approximately 50 per cent water. It would appear from its present production that the commercially productive life of this well is nearing an end. The Standard Oil Co.'s No. 28 South Whittier Community was recently plugged back from the Clarke zone to the Meyer horizon at 4,553 feet and recompleted pumping 35 bbls. of 34.1 gravity oil cutting 15 per cent water. This well was originally completed in August, 1930, flowing 130 bbls. per day from the Clarke zone at 7,925 feet.

The Wilshire Oil Co. has reconditioned three wells in the Santa Fe Springs Field during the past two months. No. 1-B Cecelia, originally completed flowing 4,400 bbls. per day from 5,750 feet in November, 1928, has recently been plugged back to the Buckbee horizon at 5,700 feet and returned to production pumping 96 bbls. of relatively clean 33.8 gravity oil per day. During the interval between the original completion and the latest work done on this well, it was deepened on two different occasions. In July, 1929, it was redrilled and deepened to 7,175 feet and recompleted flowing 3,360 bbls. per day from 7,175 feet. In April, 1930, it was again deepened and recompleted doing 483 bbls. per day from 7,954 feet.

IMPORTANT SOUTHERN CALIFORNIA WILDCATS

Company, well and location—	S. T. R.	Depth	Status—
Hines Pet., No. 1 Ocean Park, Los Angeles Co.	9- 2-15	7,414	suspended
Taylor Oil Co., No. 1 Culver, Los Angeles Co.	12- 2-15	6,238	suspended
Co-operative Dev. Co., No. 1 Del Rey, Los Angeles Co.	26- 2-15	1,683	cemented
Lawndale Pioneers, Inc., No. 1 Peck, Los Angeles Co.	20- 3-14	6,378	suspended
Barcus, W. L., No. 1 Watson, Los Angeles Co.	28- 4-13	rig	rigged up
Baldwin Oil Co., No. 9 Inglewood, Los Angeles Co.	7- 2-14	4,160	redrilling
Baldwin Hills Synd., No. 1 Inglewood, Los Angeles Co.	17- 2-14	4,090	suspended
Pacific National Oil Co., No. 1 Inglewood, Los Angeles Co.	7- 2-14	4,460	deepening
Bucker & Croul, No. 2 Puente, Los Angeles Co.	37- 2-10	2,200	suspended
El Dorado Oil Co., No. 1 Puente, Los Angeles Co.	30- 2- 9	2,770	hd. sh. drilling
Jones, W. L., No. 1 Bell, Los Angeles Co.	31- 2-12	1,593	suspended
Weist Oil Co., No. 1 Montebello, Los Angeles Co.	34- 1-11	4,902	suspended
Blinn & Gray, No. 1 Montebello, Los Angeles Co.	6- 2-11	5,060	suspended
McNeil, A. W., No. 1 Montebello, Los Angeles Co.	7- 2-11	....	material
Wardell & Menichini, No. 1 Montebello, Los Angeles Co.	7- 2-11	304	suspended
Yellowstone Oil Co., No. 1 Alhambra, Los Angeles Co.	24- 1-13	3,919	suspended
Caballero Estates, No. 1 Calabasas, Los Angeles Co.	33- 1-16	1,571	gr. sh. drilling
Marble, Willard, No. 1 Chatsworth, Los Angeles Co.	6- 2-16	1,395	suspended
Ball, W. T., No. 1 Newhall, Los Angeles Co.	34- 3-16	1,364	fishing
Ajax Pet., No. 1 Newport, Orange Co.	21- 6-10	7,259	suspended
Nuell Co., No. 1 Newport, Orange Co.	29- 6-10	1,970	cleaning out
Buena Park Oil Co., No. 1 Buena Park, Orange Co.	34- 3-11	....	material
Orangethorpe Pet., No. 1 Brea, Orange Co.	32- 3-10	2,007	sd. sh. drilling
Beck, Alfred, No. 1 Corona, Riverside Co.	8- 4- 6	1,116	suspended
Splndletop Oil Co., No. 1 Salton Sea, Riverside Co.	25- 7-10	3,590	suspended
Duncan, N. L., No. 1 Sagebrush, Riverside Co.	8- 4- 6	1,157	suspended
Colan Dev. Co., No. 1 Redlands, San Bernardino Co.	25- 1- 2	2,393	sidetracking
Mason Oil Co., No. 1 Salton Sea, Imperial Co.	1-17-15	667	sd. sh. drilling
Woods, D. H., No. 1 Salton Sea, Imperial Co.	7-11-16	761	sd. sh. drilling
Borderland Oil Co., No. 3 Encinitas, San Diego Co.	29-16- 4	2,677	suspended
South Bay Oil Co., No. 1 Border, San Diego Co.	31-18- 2	1,243	suspended
Itasca Pet. Co., No. 1 Mesa, San Diego Co.	33-18- 1	1,701	cleaning out
Oklahoma Oil Corp., No. 1 Palms, San Diego Co.	35-11- 8	1,888	redrilling
Shannon, G. H., No. 1 Kearney, San Diego Co.	14-15- 3	446	suspended

IMPORTANT NORTHERN CALIFORNIA WILDCATS

Company, well and location—	S. T. R.	Depth	Status—
Standard, No. 1 Santa Rosa Island, Santa Barbara Co.	....	mtl.	building rig
Barnsdall, No. 1 Los Alamos, Santa Barbara Co.	31- 8-33	4,571	br. sh. drilling
Western Gulf, No. 1 Santa Maria, Santa Barbara Co.	5- 9-33	9,440	hd. sd. drilling
Wilson, N. S., No. 1 Los Alamos, Santa Barbara Co.	2- 7-35	4,979	suspended
Equity Oil Co., No. 1 Coal Oil Point, Santa Barbara Co.	24- 4-29	2,110	suspended
Bolsa Chica, No. 2 Coal Oil Point, Santa Barbara Co.	25- 4-29	....	location
Cuyama Oil Co., No. 1 Cuyama, Santa Barbara Co.	12-10-27	rig	rigged up
Pacific Western, No. 1 Gibraltar, Santa Barbara Co.	14- 5-27	2,345	suspended
The Texas Co., No. 1 Carpinteria, Santa Barbara Co.	33- 4-25	1,752	sd. sh. drilling
Associated, No. 1 Rincon Creek, Ventura Co.	19- 4-24	2,080	suspended
Woodrow Pet., No. 1 Miguelito, Ventura Co.	4- 3-24	2,463	reaming
Bell, H. H., No. 1 South Mountain, Ventura Co.	22- 3-21	2,484	suspended
Wilshire Oil Co., No. 1 Sulphur Mountain, Ventura Co.	20- 4-21	....	grading
Superior Oil Co., No. 1 Timber Canyon, Ventura Co.	13- 4-21	....	grading
Magu Synd., No. 1 Oxnard, Ventura Co.	17- 1-25	5,812	fish for D.P.
American Oil Co., No. 1 Conejo, Ventura Co.	33- 2-20	1,590	suspended
Graham & Loftus, No. 1 Goose Lake, Kern Co.	20-27-22	6,619	abandoned
General Pet., No. 1 Buttonwillow, Kern Co.	6-28-23	3,094	suspended
Wilshire Oil Co., No. 1-A Buttonwillow, Kern Co.	7-29-24	7,000	plug 4,380 ft.
Milham Expl. Co., No. 14 Buttonwillow, Kern Co.	7-28-23	3,573	testing
Milham Expl. Co., No. 15 Buttonwillow, Kern Co.	7-28-23	rig	rigging up
Purman, T. H., No. 1 McKittrick, Kern Co.	22-29-21	3,963	circulating
Welport Oil Co., No. 8 McKittrick, Kern Co.	26-29-21	1,298	cleaning out
Welport Oil Co., No. 2 McKittrick, Kern Co.	19-29-21	346	sd. drilling
General Pet., No. 1 Beiridge, Kern Co.	30-28-21	8,260	suspended
Wallace, K. C., No. 1 Beiridge, Kern Co.	32-29-21	4,222	suspended
Rio Grande, No. 1 Shale Hills, Kern Co.	7-27-19	1,106	sd. sh. drilling
Rio Cal Pet., No. 1 Shale Hills, Kern Co.	2-27-18	2,355	suspended
Fullerton Oil Co., No. 7 Semitropic, Kern Co.	1-27-22	rig	rigging up
Cumberand Oil Co., No. 2 Devil's Den, Kern Co.	17-26-18	3,225	suspended
Hannah, Tom, No. 1 Devil's Den, Kern Co.	25-25-18	3,306	resume work
Gauthier, C. B., No. 1 Devil's Den, Kern Co.	24-25-19	388	sd. sh. drilling
Fowler, F., No. 1 Blackwell Corner, Kern Co.	15-26-19	1,198	suspended
Regina Oil Corp., No. 1 Mojave, Kern Co.	26-10-14	2,790	redrilling
Meridian Oil Co., No. 1 Mojave, Kern Co.	11- 9-15	4,000	suspended
Harding, J. B., No. 1 Mojave, Kern Co.	5-10-10	1,030	redrilling
Barnsdall Oil Co., No. 1 Tejon, Kern Co.	15-11-20	6,801	sd. sh. drilling
Ritchie, J. J., No. 1 Tejon, Kern Co.	33-11-19	6,025	suspended
Descanso Oil Co., No. 1 Tejon, Kern Co.	31-11-19	2,749	suspended
Associated, No. 1 Jacalitos, Fresno Co.	22-21-15	6,197	suspended
Kingsburg Expl. Co., No. 1 Kingsburg, Fresno Co.	30-16-23	2,894	sd. sh. drilling
Kent & McDonald, No .1 Carrizo Plains, S. Luis Obispo Co.	3-32-22	2,693	redrilling
Emerich Oil Co., No. 1 Carrizo Plains, San Luis Obispo Co.	22-32-22	1,414	sd. sh. drilling
Trav-El Oil Co., No. 1 Carrizo Plains, San Luis Obispo Co.	7-32-22	2,450	cleaning out
Indian Dome Oil Co., No. 1 Edna, San Louis Obispo Co.	26-31-12	3,352	suspended
Martin, J. D., No. 1 Edna, San Luis Obispo Co.	5-31-13	3,070	suspended
Paso Robles Oil Co., No. 1 Edna, San Luis Obispo Co.	27-27-11	4,191	suspended
Schilling, C., No. 1 Atascadero, San Luis Obispo Co.	1-29-12	1,650	suspended
Pacific Inland, well No. 1, Monterery Co.	19-23-15	2,340	cemented
Brown, W. F., No. 1 Parkfield, Monterey Co.	15-23-14	1,051	suspended
Guess, E. B., No. 1 Corcoran, Kings Co.	7-21-21	6,197	suspended
Woodward, Glen, No. 1 Dudley Ridge, Kings Co.	32-22-20	589	cemented
Scott Bros. Drlg. Co., No. 1 Dudley Ridge, Kings Co.	18-22-19	1,346	sd. sh. drilling
Lacal Natural Gas Co., No. 1 Dudley Ridge, Kings Co.	32-22-20	541	cemented
Kettleman Natural Gas Co., No. 1 Dudley Ridge, Kings Co.	18-22-19	1,100	suspended
Irma Investment Co., No. 2 Dudley Ridge, Kings Co.	7-22-20	1,324	suspended
Dudley Dome Oil Co., No. 1 Dudley Ridge, Kings Co.	9-22-20	407	sd. sh. drilling
Eagle Oil Co., No. 1 Dudley Ridge, Kings Co.	15-22-20	1,125	gas, shut in
Eagle Oil Co., No. 2 Dudley Ridge, Kings Co.	15-22-20	911	suspended
Tulare Basin Gas Co., No. 2 Dudley Ridge, Kings Co.	2-22-19	rig	suspended
Knudsen & Schmidt, No. 1 Reef Ridge, Kings Co.	36-22-17	5,894	redrilling
Kettleman Ridge Oil Co., No. 1 Avenal, Kings Co.	10-23-16	1,148	testing
Magee & Stone, No. 1 Alpaugh, Kings Co.	34-24-22	4,710	sd. sh. drilling
Guess, E. B., No. 2 Dudley Ridge, Kings Co.	12-23-22	1,840	testing
Ingraham, R. H., No. 1 Porterville, Tulare Co.	34-22-27	....	location
Ducor Pet. Co., No. 1 Ducor, Tulare Co.	14-24-27	2,200	suspended
Inland Valley Oil Co., No. 1 Visalia, Tulare Co.	24-17-24	2,092	suspended
Gravity Expl. Co., No. 1 Alpaugh, Tulare Co.	11-24-23	3,207	fishing
Ellis & Sanford, No. 1 Tulare Lake, Tulare Co.	30-24-23	1,920	suspended
Twin State Oil Co., No. 1 Point Arena, Mendocino Co.	14-12-17	7,694	suspended
Napa Oil Co., No. 1 Griffith, Napa Co.	7- 8- 3	3,848	cleaning out
Colusa Oil Co., No. 1 Bush, Colusa Co.	31-15- 4	1,040	suspended
Oakdale Oil Co., No. 1 Oakdale, Stanislaus Co.	3- 2-10	4,750	suspended
Hilderbrandt, R., No. 1 Crow's Landing, Stanislaus Co.	36- 6- 7	1,130	suspended
Rushing Oil Co., No. 1 Waterford, Stanislaus Co.	20- 3-13	2,594	sd. sh. drilling
Pacific Northern Oil Co., No. 1 Guinda, Yolo County	23-12- 3	2,780	sd. sh. drilling
Easton & Monell, No. 1 Colma, San Mateo Co.	25- 3- 6	3,124	sd. sh. drilling

No. 11 Off of the Bandini Petroleum Co., a subsidiary of the Wilshire Oil Co., has been recompleted pumping 110 bbls. of clean 32.9 gravity oil per day after being plugged back from the O'Connell to the Buckbee zone at 5,881 feet. This well was originally completed in March, 1930, flowing 1,630 bbls. per day from 6,749 feet. The Wilshire Annex Oil Co.'s No. 1 Eagle, another well plugged back from the O'Connell to the Buckbee zone, was recompleted a week or so ago pumping 102 bbls. of relatively clean 35.1 gravity oil per day from 5,690 feet. This well was originally completed in the O'Connell zone flowing 8,300 bbls. per day from 6,383 feet. It will be noted from these three recompletions that the Wilshire Oil Co. has experienced exceptional success in plugging back to the Buckbee zone as the production in each case was clean.

The best well finished in the Santa Fe Springs Field in a long time was the Union Oil Co.'s No. 12 Alexander, which was returned to production several weeks ago doing 1,440 bbls. of 35.6 gravity oil per day, after being plugged back from the second Nordstrum zone at 5,193 feet to the first Nordstrum zone at 4,998 feet. This well was originally completed in the Nordstrum zone flowing 5,725 bbls. per day from 5,438 feet in December, 1928. It was recompleted again in November, 1930, after being plugged back from 5,438 feet to 5,193 feet The Union's No. 6 Howard was also improved mechanically by plugging operations. This well was originally completed in November, 1923, flowing 3,040 bbls. per day from the Meyer zone at 4,700 feet. It was recompleted in October, 1924, at which time the hole was plugged back to 4,625 feet. It has recently been recompleted for the second time and is at present pumping 109 bbls. of 35.4 gravity oil from 4,484 feet. The Bardeen Petroleum Co. has successfully recompleted its well No. 3 in the Santa Fe Springs Field after plugging back from the Clarke and Hathaway zones to the Meyer horizon. This well, originally completed flowing 8,500 bbls. per day from 8,064 feet in December, 1929, was recently returned to production pumping 75 bbls. of 32.1 gravity oil per day after being plugged back to the Meyer zone at 4,471 feet. George F. Getty, Inc., recently recompleted No. 44 Nordstrum pumping 151 bbls. of 33.9 gravity oil cutting 20 per cent water from 6,890 feet. This well was originally completed in the Clarke zone flowing 870 bbls. per day from 7,950 feet in February, 1930, and a little over two years later plugged back to the O'Connell zone at 6,890 feet, with the result noted above.

PENNA GRADE MEETING

A call has been issued for the annual meeting of the Pennsylvania Grade Crude Oil Association to be held at the Hotel Emery, Bradford, Pa., on Friday, June 24. The meeting will begin with a luncheon at 12 noon.

The routine business of an annual meeting will be conducted, including the election of directors for the coming year. Vice President Dow will give an informal talk on the economic situation connected with the Pennsylvania grade oil industry.

FATALLY BURNED

FORT WORTH, Tex., June 6.—Tom James, oil operator of Albany, Tex., was fatally burned when a well he was drilling near that city blew in and the gas ignited. Warren Klinger, drilling contractor and partner of James, and Homer Barksdale, oil field driller, were also injured in the same fire. They are in the Albany Hospital.

World Oil Conference Fails in Effort for Compact With Soviet

NEW YORK, June 6.—Negotiations between executives of leading American and European oil companies and important heads of the Soviet oil industry, looking to the enactment of an agreement for the stabilization of world oil markets through closer control of Russian exports, came to an end here this week with no agreement reached and settlement of the Russian problem apparently as remote as when the meetings were initiated three weeks ago.

In a joint announcement of the termination of the gathering, Charles E. Arnott, president of the Socony-Vacuum Corp., at whose invitation the foreign oil men came to New York for the meeting, and Philip Rabinovich, member of the Soviet Commissariat for Foreign Trade, said:

"The representatives of American and foreign interests in the export petroleum market, who have been in conference during the past three weeks with representatives of the Soviet oil export organization and who have together been carefully studying the problem created by the lack of balance between production and consumption, regret to announce that it has been found impossible at this time to reach any mutually satisfactory agreement for the solution of these problems."

While the formal statement declares that an understanding has been impossible to arrive at "at this time," it is indicated informally that the negotiations are definitely concluded, and that further efforts toward the stabilization of world markets will be carried out along the lines of possible cartel agreements with principal countries interested, with the first general conference to be held probably taking in Rumania. Future meetings of this sort, it is further indicated, will in all probability be held abroad, probably in London or Paris.

Drilling Revival in Bradford-Allegany to Bring Back Potential

BRADFORD, Pa., June 4.—T. P. Thompson, Jr., prominent operator in the Bradford Field, in an address before the Bradford Chamber of Commerce, said that the potential production of the Bradford Field had fallen to a point where it is little if any more than the allowable, and that he doubted if the field could produce 2,000 bbls. per day more than its present output of 29,000 bbls. and maintain the production for any length of time. The reason for the decline in potential production is that little drilling has been done in the past year because of the production curtailment program.

Mr. Thompson added that producers in the Bradford and Allegany Fields having become cognisant of the danger of a real underproduction, had started a drilling campaign to bring their leases back to a greater potentiality and that there are 118 wells drilling in the Allegany Field in New York and the Bradford Field. These wells are divided among water intake wells and oil wells. The wells now being drilled, Mr. Thompson said, will not immediately affect or increase production, especially where the drilling is done on pressure flood properties, as it will take at least six months for these wells to start to produce in any quantity.

GULF COAST FIELDS AND WILDCATS

(Continued from Page 91)

Humble O. & R. Co. and Gulf Prod. Co.'s No. 5-A Lockwood & Sharp, J. Rabb Sur., 1,000 ft. W. 300 ft. N of SE cor. of Tr. 3 (469.3 ac.) ..... Derrick.

Humble O. & R. Co. and Gulf Prod. Co.'s No. 3-B Lockwood & Sharp, J. Rabb Sur., 1,000 ft. from E line and 300 ft. from N line of Tr. 1 (938.75 ac.).. Location.

Humble O. & R. Co. and Gulf Prod. Co.'s No. 4 George, J. Rabb Sur., 3,000 ft. E, 322 ft. S of NW cor. of 200-ac. tr. ..... Gumbo 955 ft; cmtd. 10¾-in. csg.

Humble O. & R. Co. and Gulf Prod. Co.'s No. 1-B George, J. Rabb Sur., 1,950 ft. from W line, 350 ft. from N line of tr. ..... Drlg. shale 2,885 ft.

The Texas Co.'s No. 1 Wolters (M. H. Gubbels), Samuel Kennedy Sur., 742 ft. from W line, 100 ft. from S line of 100-ac. tract ..... Drlg. gumbo, lime and boulders 2,085 ft.

HIGH ISLAND—GALVESTON COUNTY

Yount Lee Oil Co.'s No. 28 Cade, N. Fitzsimmons Sur., 600 ft. S, 150 ft. E from No. 26..... Drlg. hard sand 5,100 ft.

Yount Lee Oil Co.'s No. 29 Cade, N. Fitzsimmons Sur., 300 ft. E of No. 27 and 240 ft. N of No. 16 ..... Drlg. sand and shale 4,240 ft.

Yount Lee Oil Co.'s No. 1 Broussard & Orme, 300 ft. E of N cor. of N. Fitzsimmons Sur., in Martin Dunman Sur. ..... Drlg. sand and shale 5,350 ft.

Yount Lee Oil Co.'s No. 2 Broussard & Orme, Martin Duman Sur., 300 ft. SE of No. 1 ..... Derrick.

Yount Lee Oil Co.'s No. 11 Smith, Martin Dunman Sur., 130 ft. E of No. 2 and 440 ft. N of No. 5 ..... Drlg. sand and lime 2,420 ft.

Yount Lee Oil Co.'s No. 2 Nellie League, Martin Dunman Sur., 230 ft. N of No. 1 and 300 ft. E ..... Drlg. sand and lime 2,350 ft.

SARATOGA—HARDIN COUNTY

Rio Bravo Oil Co.'s No. 137-A ..... Abd. 633 ft.

Rio Bravo Oil Co.'s No. 138-A Cotton ..... Drlg. rock 272 ft.

HUMBLE—HARRIS COUNTY

Cullen & West's No. 4 Burt, J. B. Stevenson Sur., 50 ft. NW of No. 3 in line with No. 2 ..... Cutting and pulling liner 4,826 ft.

J. D. Clay's No. 1 Bender, Robert Dunman Sur., 200 ft. from W line and 100 ft. from S line of 100-acre tract ..... Standing 1,165 ft.

John Deering's No. 1 C.O.&G.-The Texas Co., J. B. Stevenson Sur. ..... Drlg. sand and lime 1,100 ft.

Rio Bravo Oil Co.'s No. 1 fee, 200 ft. from N line, 50 ft. from W line, Blk. 4, Bender South Addn., W. B. Adams Sur. (W.O.) ..... Swabbing 3,733 ft.

Sun Oil Co.'s No. 26 Bender (D.D.), W. B. Adams Sur... Drlg. rock 3,620 ft.

Sun Oil Co.'s No. 55 River, Robt. Dunman Sur., 50 ft. from E line, 495 ft. from S line of tr. ..... Drlg. shale 1,242 ft.

The Texas Co.'s No. 26 House, Mary Owens Sur., 100 ft. W of No. 20 ..... Rig.

The Texas Co.'s No. 25 Wheeler & Pickens, 200 ft. N, 50 ft. E of SW cor., Lot 24, J. B. Stevenson Sur. ... Cap rock 1,750 ft.; abd.

E. M. Wilson's No. 9 W.&P.-Texas fee, 40 ft. out of NW cor., Blk. 25, J. B. Stevenson Sur. ..... Drlg. sand and shale 1,350 ft.

PIERCE JUNCTION—HARRIS COUNTY

Abercrombie & Harrison's No. 2 Ritter (D.D.), Jas. Hamilton Sur. No. 51 ..... Failed to pull screen 4,654 ft; trying to sidetrack.

Anderson & Plummer's No. 7 Whitehead, Jas. Hamilton Sur. No. 51, 248 ft. S of No. 4 and 304 ft. from E line ..... Salt 3,235-5,656 ft; abd.

Navarro Oil Co.'s No. 15 Dooley-Tex. Exp. (D.D.), Jas. Hamilton Sur. No. 51, 50 ft. from W line, 1,278 ft. from S line of tr. ..... Cutting and pulling screen 4,492 ft.

Rio Bravo Oil Co.'s No. 24-A Settegast, J. Kopman Sur. No. 44, 1,900 ft. S and 200 ft. W of NE cor. of "A" lease ..... Coring sand showing oil 4,517 ft.

Rio Bravo Oil Co.'s No. 25-A Settegast, J. Kopman Sur. No. 44 (location check to come) ..... Derrick.

MYKAWA—HARRIS COUNTY

Crown-Framer Oil Co.'s No. 2 Minnetex, 125 ft. from W line and 100 ft. from S line, Lot 251, Wm. J. Lovett Sur. ..... Drlg. shale 4,780 ft.

ESPERSON—LIBERTY COUNTY

Cranfill-Reynolds Co.'s No. 20 Esperson, C. W. Fisher Sur., 471 ft. from W line and 510 ft. N of No. 5 Esperson ..... No report.

Cranfill-Reynolds Co.'s No. 5 Davis (D.D.), Kokernut Sur., 150 ft. from S line, 1,197 ft. from E line of tract ..... No report.

Cranfill-Reynolds Co.'s No. 9 Moore's Bluff, M. Duncan Sur., 500 ft. S of N line of Moore's Bluff tract in line with No. 6 Davis and No. 6 Moore's Bluff ..... Location.

SOUTH LIBERTY—LIBERTY COUNTY

The Texas Company's No. 2 Pickett (D.D.), M. G. White Sur., 250 ft. W and 62 ft. S from NE cor. of 12.2-acre tract ..... T.D. 3,536 ft; milling on junk 3,473 ft.

HULL—LIBERTY COUNTY

Eclipse Oil Co., No. 2 Barrow, Jesse Devore Sur., 55 ft. W, 35 ft. S of most easterly NE cor. 3.7-ac. tract.... Drlg. gumbo 1,725 ft.

Hannah Oil Co.'s No. 1 Hannah, Jesse DeVore Sur., 100 ft. W of The Texas Co.'s No. 1 Hannah ..... Spudded.

D. & L. Prod. Co. and Bashara Oil Co.'s No. 1 Povito, Jesse Devore Sur., 34½ ft. from E line and 30 ft. from N line of 5-acre strip ..... T.D. 4,553 ft; csg. collapsed.

D. & L. Prod. Co.'s No. 3 Mecom & Layton, Jesse DeVore Sur., 80 ft. from S line, 60 ft. from W line of 3-ac. tr. ..... Rigging up.

Healey & Southerland's No. 1 Findley, Jesse DeVore Sur., 50 ft. from E line and 100 ft. from N line of 4-ac. tr. ..... Rig.

Republic Prod. Co.'s No. 51-A Dolbear, Jesse DeVore Sur., 25 ft. N of No. 55 ..... Rig.

Republic Prod. Co.'s No. 61 Dolbear (W.O.) ..... Drlg. sandy shale 2,325 ft.

MARKHAM—MATAGORDA COUNTY

Claude Hamill et al's No. 2 Northern Irrigation Co., I.&G.N. Sur., Blk. 9, Sec. 5, 50 ft. NW of No. 1..... Drlg. shale 5,816 ft.

E. M. Hamill's No. 2 Meyers, Wm. Hadden Sur., 225 ft. NE of No. 1 and 210 ft. southerly from Powers & Hamill's No. 2 ..... Set 1 joint of 4½-in. screen 3,270 ft; comp. flowing 643 bbls. P.L. oil first 24 hrs., ½-in. choke; 125 lbs. pressure on tubing.

Harvey Smith et al's No. 1 W. H. Gray (W.O.), Wm. Hadden Sur., 400 ft. from S line, 150 ft. from E line of Blk. 2 ..... Drlg. deeper.

Southern Drlg. & Prod. Co's No. 1 Hudson, Wm. Hadden Sur., 300 ft. S of road and 100 ft. from river ..... Derrick.

The Texas Company's No. 1 Texas Pipe Line Co., Wm. Hadden Sur., Blk. 5, 50 ft. S and 50 ft. W of NE cor. of tract ..... Drlg. hard lime and shale 3,161 ft.

WEST COLUMBIA—BRAZORIA COUNTY

Hogg et al's No. 1 Hogg, Martin Varner Sur., 1,250 ft. N and 125 ft. E of Sw cor. of Gulf, W. C. Hogg 200 ac. ..... Rig.

PORT NECHES—ORANGE COUNTY

The Texas Co.'s No. 3 Stark, 350 ft. E, 100 ft. N of SW cor. of Marshall Beauchamp Sur. ..... Cmtd. 20-in. csg. 101 ft.

The Texas Co.'s No. 2 Kuhn (D.D.), 589 ft. W and 150 ft. S of NE cor. Mary E. Hall Sur. No. 2 ..... Flowing 190 bbls. net oil, 8% mud and sand, ¼-in. choke; sand 4,315 ft.

ORANGE—ORANGE COUNTY

Sun Oil Co.'s No. 1 Bellis (D.D.) ..... No report.

REFUGIO—REFUGIO COUNTY

E. M. Jones' No. 1-B Mitchell (D.D.), 250 ft. NW of SE line and 250 ft. SW of Mission River ..... Sand showing oil 9,167 ft; to set 5 3/16-in. csg.

Larco Gas Co.'s No. 5 Strauch, Refugio Town tract, Lot 4, Blk. 2, 100 ft. W of No. 2 ..... S.D. 4,967 ft.

Pearson Properties' No. 2 Ryals (W.O.), 600 ft. from S line and 150 ft. from W line of lease ..... T.D. 6,614 ft.; sidetracked at 5,194 ft; drlg. 6,675 ft.

United Prod. Corp.'s No. 3 W. J. Fox (D.D.), Wm. Hews & L. Brown Sur., 2,099 ft. NE along SE line from SE cor. of lease, thence 1,690 ft. NW at right angles ... T.D. 6,620 ft; plugged to sand 6,464-80 ft; comp. flowing S.W.; 1,000 lbs. pressure on tubing and 1,200 lbs. on csg.; ¼-in. choke; shut in.

United Prod. Corp.'s No. 4 W. J. Fox, 2,600 ft. NE along SE line from SE cor. of Wm. Hews and L. Brown Sur., thence 1,420 ft. NW at right angles ... T.D. 6,560 ft; to plug back.

United Prod. Corp.'s No. 5 W. J. Fox, 2,150 ft. NE along SE line from SE cor. of Wm. Hews and L. Brown Sur., and thence 890 ft. NW at right angles ... T.D. 5,886 ft; sand 5,842-54 ft; set 27 ft. blank; 18 ft. of 5-in. screen and 10 ft. blank; comp. flowing 265 bbls. P.L. oil; 175 lbs. on tubing and 500 lbs. on csg.; ¼-in. chokes; shut in.

CLAY CREEK—WASHINGTON COUNTY

John Walker et al's No. 1 Henry Wendt, J. F. Perry Sur., 150 ft. from SW line and 405 ft. from SE line of tract ... S.D. 1,254 ft.

SOUTH LOUISIANA FIELDS

IOWA—CALCASIEU AND JEFF DAVIS PARISHES

Shell Petroleum Corp.'s No. 1 Fontenot, Sec. 7-9s-6w, 450 ft. due E No. 2 Heyd ... Sand 6,895-6,912 ft; set 1 joint of 5-in. screen with 5-in. pipe to top and tapered tubing; comp. flowing 843 bbls. first 8 hrs.; ¼-in. choke; 1,275 lbs. on csg. and 1,520 lbs. on tubing.

EDGERLY—CALCASIEU PARISH

C. M. Crotty Oil Co.'s No. 7 Lillard (W.O.) ... T.D. 2,530 ft.; S.D.

Emerson & Moore's No. 1-B Hunter, 600 ft. E, and 664 ft. N of SW cor. SW SE, Sec. 21-9s-11w ... Drlg. sandy shale 4,065 ft.

LOCKPORT—CALCASIEU PARISH

Union Sulphur Co.'s No. 3 Martha Moss, 300 ft. W, 150 ft. S, NE cor. NW SE, Sec. 8-10s-9w ... Drlg. sandy shale 4,316 ft.

SULPHUR—CALCASIEU PARISH

Union Sulphur Co.'s No. 751 fee (D.D.), Sec. 29-9s-10w ... Drlg. sandy shale 4,415 ft.

Union Sulphur Co.'s No. 769 fee, 295 ft. S, 918 ft. W of C of Sec. 29-9s-10w ... Drlg. shale 5,925 ft.

Union Sulphur Co.'s No. 770 fee, 292 ft. S, 1,243 ft. W of center, Sec. 29-9s-10w ... Location.

Union Sulphur Co.'s No. 771 fee, 431 ft. S, 340 ft. W of center, Sec. 29-9s-10w ... Drlg. sand and shale 4,980 ft.

Union Sulphur Co.'s No. 772 fee, 145 ft. S, 882 ft. W of center, Sec. 29-9s-10w ... Location.

VINTON—CALCASIEU PARISH

Vinton Pet. Co.'s No. 5 Matilda Gray (D.D.), 456 ft. W, 362 ft. N, SE cor. SW NE, Sec. 33-10s-12w ... Cmtd. bottom of hole to sidetrack 3,470 ft.

HACKBERRY—CAMERON PARISH

Calcasieu Oil Co.'s No. 8 Dorion, 1,280 ft. S and 792 ft. E of NW cor. Sec. 24-12s-10w ... No report.

Calcasieu Oil Co.'s No. 34 Watkins, 435 ft. E, 430 ft. S, NW cor., Sec. 24-12s-10w ... Derrick.

R. E. Sless' No. 2 Vincent (D.D.), 2,395 ft. S, 1,355 ft. W, NE cor., Sec. 30-12s-10w ... Losing returns 2,950 ft.

Sultex Oil Co.'s No. 1 Dorion, 181 ft. W, 12 ft. N of junction of W line of Sec. 46-12s-10w and S bank of Kelso Bayou in Sec. 36 ... S.D. 3,952 ft.

J. G. Sutton's No. 7 Irvin, 2,120 ft. N and 1,845 ft. W of SE cor., Sec. 13-12s-10w ... No report.

The Texas Co.'s No. 9 State, 2,229 ft. N, 918 ft. E from SE cor. Sec. 13-12s-10w, in 12s-9w ... Location.

The Texas Co.'s No. 10 State, 2,375 ft. N, 564 ft. E, SE cor. Sec. 13-12s-10w, in Twp. 12s-9w ... Location.

Union Sulphur Co.'s No. 2 Gulf Land (Humble lease), 661 ft. E and 810 ft. N of SW cor., Sec. 12-12s-10w ... Drlg. sticky shale 2,992 ft.

Union Sulphur Co.'s No. 1 Gulf land (Pure Oil Co. lease), 1,420 ft. N, 400 ft. W of SE cor. Sec. 11-12s-10w ... Drlg. wtr. sand 7,880 ft.

Yount Lee Oil Co.'s No. 51 State, 545 ft. S, 560 ft. E of NW cor. of Sec. 24-12s-10w ... Lime rock 2,850 ft.

Yount Lee Oil Co.'s No. 11 School land, 2,810 ft. W and 1,608 ft. N, SE cor., Sec. 15-12s-10w ... Derrick.

STARKS—CALCASIEU PARISH

Gulf Refining Co.'s No. 30 Lutcher-Moore, Sec. 19-9s-12w, 300 ft. S of No. 16 and 300 ft. W of No. 20 ... Comp. pumping 60 bbls. fluid, 15 bbls. net oil.

SWEET LAKE—CAMERON PARISH

Pure Oil Co.'s No. 11 Yount Lee, Sec. 12-13s-8w, 800 ft. S 66 deg. 42 min. from No. 9 ... Location.

MISCELLANEOUS WILDCATS

TEXAS

AUSTIN COUNTY

O'Hara Oil & Gas Co.'s No. 1 Nellius, J. C. Cummings Hacienda Sur., 650 ft. N of No. 1 Schroeder in 18-acre tract, north edge Mill Creek ... Derrick.

Taylor & Mitchell's No. 1 Schlecte, 1,850 ft. from SE line and 3,100 ft. from NE line of John Fitzgibbons Sur. ... Abd. 3,730 ft.

BRAZORIA COUNTY

John Deering's No. 1 C. W. Chapman, 294 ft. from S line and 104 ft. from E line of Lot 2, Andrew Robinson Sur. ... S.D. 1,990 ft.

J. R. Ingram's No. 2 Levitt, John Peske Sur., 75 ft. NW of No. 1 ... S.D. 1,735 ft.

The Texas Co.'s No. 2 Belcher, 1,728 ft. southeasterly and 1,231 ft. southwesterly at right angles out of N cor. tract, Harvey N. Little Sur. ... T.D. 6,056 ft; plugged to 5,575 ft.

The Texas Company's No. 3 Belcher, Manvel, Harvey N. Little Sur., 1,320 ft. southwesterly and 200 ft. southeasterly out of N cor. of Belcher lease ... Derrick.

BURLESON COUNTY

Ball & Knob's No. 1 Polansky, M. B. Lawrence Sur., 359 ft. from E line and 469 ft. from N line of 158-ac. tr. ... Rig.

E. M. Bracey et al's No. 1 Bracey, J. Lastly Sur., 850 ft. from E cor. of P. Taylor 110 acres, SE along NE line of J. G. Houston 160 acres, thence 180 ft. at right angles in 3-acre tract ... Location.

Marek & Son's No. 3 A. Marek, N. McFaddin Sur., 1,068 ft. N and 225 ft. W of SE cor. of tract ... Standing 2,210 ft.

M. O. & T. Corp.'s No. 1 Rigers ... Shale 2,630 ft.

Sampson Oil & Gas Co.'s No. 1 Duckworth & Gilley, 100 ft. from S line and 100 ft. from W line of Blk. 8, P. Singleton Sur. ... Drlg. shale 1,925 ft.

J. E. Stubblefield et al's No. 1 Mitchell, A. T. Woolridge Sur., 81 ft. SW and 4,340 ft. SE of S cor. of Joseph Henson Sur. ... Gumbo 600 ft.; standing.

COLORADO COUNTY

Coyle-Concord Oil Co.'s No. 1 Nelson, I.&G.N. Sur., Sec. 43 ... Drlg. gumbo 1,035 ft.

FORT BEND COUNTY

O'Hara et al's No. 1 Brown, Pilant Lake, Wm. Barrett and Abner Harris Sur., 600 ft. out of SW cor. of Brown 600-acre tract ... Fishing D.S. 4,570 ft.

Naylor & DeCosta's No. 1 Naylor, 6,350 ft. N, 55 deg. E from SW cor. 653-acre tract in Christman Sur. ... Cmtd. 12½-in. csg. 1,221 ft.; S.D.

Stone & Wyman's No. 1 Beard, H.&T.C. Sur. No. 118, 1,150 ft. from NW line, 1,892 ft. from NE line ... No report.

HARDIN COUNTY

Joe E. Proctor's No. 1 Russell & Teagle, 3,650 ft. E and 2,777 ft. N of NW cor. of Wm. W. Young Sur. ... No report.

Votaw Oil Co.'s No. 1 Southwestern Lbr. Co., 160 varas W of C of E line of Mary K. Sherman Sur. ... Rigging up.

HARRIS COUNTY

T. V. Buckholve & Sons' No. 1 Miller, Arthur McCormick Sur. ... D.S. stuck 547 ft.; setting up new rig.

Crown-Framer Oil Co.'s No. 1 Woodburn, Genoa, August Whitlock Sur., 200 ft. out of NW cor. of tr. ... Derrick.

Crown-Framer Oil Co.'s No. 2 Woodburn, 1,400 ft. S, 400 ft. E of NW cor. August Whitlock Sur. ... Cmtd. 10-in. csg. 235 ft; T.D. 239 ft; standing.

JASPER COUNTY

Hext Drlg. Co.'s No. 1 Flourney, B. F. Jones Sur., 900 ft. NW of Helmerich & Payne's No. 1 Flourney ... T.D. 4,005 ft.; washing to bottom.

Rio Neches Oil Co.'s No. 2-A Boykin, B.B.B.&C. Sur., 330 ft. SE of No. 1-A ... No report.

JEFFERSON COUNTY

Elam & Pipkin's No. 2 Broussard, John McGaffey Sur., 150 ft. due E of No. 1 ... Drlg. 500 ft.

Jack Shultz' No. 1 M. O. Todd, 200 varas S and 88 varas E of NW cor. of Wm. Carr Sur. ... Drlg. lime 6,487 ft.

LIBERTY COUNTY

Bain-Rheubotham's No. 1 J. M. Neal, Edward Tanner Sur., 1,800 ft. E, 1,300 ft. N of most westerly NW cor. of Margaret Evans Sur. ... Moving in rig.

Devore Oil Co.'s No. 1 Finley, 10,500 ft. from E line and 2,000 ft. from S line of A. B. Hardin Sur. ... Drlg. shale 3,975 ft.

MATAGORDA COUNTY

Dr. Griffith et al's No. 3 Baer, Big Hill, 5,000 ft. N, 3,000 ft. E from SW cor. of Seth Ingram Sur. ... No report.

Shepherd's Mott Salt Dome Oil Co.'s No. 1 Hawkins, Shepherd's Mott, 5,268 ft. from N line and 1,320 ft. from E line of B. McCarthy Sur. ... Rigging up.

United North & South Oil Co.'s No. 1 Stoddard, J. C. Keller Sur., 150 ft. W and 545 ft. N of SE cor. Blk. 53, Buckeye Townsite ... Fishing baller 7,831 ft.

MONTGOMERY COUNTY

Alpha Oil Co.'s No. 1 Conroe, A. McCowan Sur. ... Tentative location.

Gohlson Bros. and Rycade Oil Corp.'s No. 1 Drought, 3,340 ft. along N line of Kronkrite Sur., from NE cor., thence 250 ft. S at right angles ... Drlg. gumbo 1,685 ft.

Falvey & McComb's No. 1 Kidd, Chas. B. Stewart Sur., NE cor. 100-ac. tr. ... Location.

Heep Oil Corp.'s No. 1 Roberts, Wm. H. Harrison Sur., 450 ft. out of SE cor. of tract ... Drlg. shale 4,415 ft.

Heep Oil Corp.'s No. 1 J. R. Freeman, John Davis Sur., 450 ft. from S line in center of 36.46-ac. tract ... Sand showing oil 5,137 ft; cmtd. 7-in. csg. 5,085 ft.

Kraft & Gesieke's No. 1 South Tex. Dev. Co., T.&N.O. Sur., Blk. 9 ... Derrick.

Pevehouse Oil Co.'s No. 1 Sealey, Jas. Pevehouse Sur., 1,575 ft. N of N line of Horton & Woodson's 1,542-acre tract and 2,226 ft. E of W line of H.&W. 1,870-acre tract ... Shut down 3,984 ft.

Rowe & Flowers' No. 1 Varner, R. House Sur., 320 ft. out of NE cor. of 33-ac. tr. ... Rigging up.

Smith & McDaniel's No. 1 Sealey, J. C. Pitts Sur., 3,482 ft. SW along SE line of survey from most southerly corner of J. E. Anderson 61.66-ac. tract, thence 4,289 ft. NW at right angles ... Drlg. shale 3,939 ft.

Strake Oil Corp.'s No. 2 South Texas Development Co., Theo. Slade Sur., 2,220 ft. S 10 deg. E of No. 1 ... Cutting and pulling liner; T.D. 5,026 ft.

ORANGE COUNTY

Altex Oil Co.'s (Veteran Oil Co.) No. 1 Reed, A. Nelson Sur. No. 1, 500 ft. from N line and 250 ft. from E line of tract ... T.D. 4,655 ft.; cmtd. 6¼-in. csg. 4,650 ft.

Crew Oil Co.'s No. 1-A Mansfield, 50 ft. E of No. 1 ... Shut down 2,275 ft.

REFUGIO COUNTY

Humble Oil & Ref. Co.'s No. 1 O'Connor (D.D.), 6,012 ft. S from NE cor. along SE line of Lon T. Rios Sur., thence 7,375 ft. W at right angles in John Keating Sur. ... Drlg. shale and lime 4,675 ft.

Humble Oil & Ref. Co.'s No. 2 O'Connor, John Keating Sur., 12,625 ft. N of S line at right angles and 3,158 ft. W of E line at right angles ... Sand showing oil 4,732 ft; preparing to test.

SAN JACINTO COUNTY

Seven Wells Oil Co.'s No. 1 Foster Lumber Co., 3,000 varas from the E line and 2,000 varas from the S line of H. Alsbury Sur. ... No report.

TRINITY COUNTY

Joseph M. Weaver's No. 1 Thompson, 150 ft. out of NE cor. of I.&G.N. Sur., No. 47 ... No report.

VICTORIA COUNTY

Bunte et al's No. 2 Keeran, Martin DeLeon Sur., 200 ft. E of No. 1 ... Coring sandy shale showing oil and gas 5,305 ft.

Cullen & West's No. 1 Keeran ranch, Martin DeLeon Sur., 450 ft. from S line, 450 ft. from W line of tr. ... Drlg. sticky shale 2,525 ft.

Houston Oil Co.'s No. 1-A McFaddin, 200 ft. from NE line, 240 ft. from SE line of I.R.R. Sur. No. 20 ... Drlg. sticky shale 4,478 ft.

T. B. Slick Estate's No. 2 McFaddin, J. Varian Sur., 3,500 ft. NW of No. 1 and 1,100 ft. NE at right angles to SW line of lease ... Sand 4,485-94 ft; comp. estimated 40,000,000 ft. dry gas, 1,300 lbs. pressure; ½-in. choke; shut in.

The Texas Company's No. 4 McFaddin, 86 deg. E, 1,738½ ft. from NE cor. of Andrew J. Gray Sur. in John M. Rine Sur. ... T.D. 2,840 ft; sidetracked 1,030-1,137 ft; losing returns.

WALKER COUNTY

Hart Oil Co.'s No. 1 Thompson Lbr. Co., Jose Ortega Sur., 1,365 ft. S, 1,876 ft. W of SW cor. of J. B. Gibson's 71-acre tract ... Shut down for repairs 2,090 ft.

Geo. F. Kerr's No. 1 Smithers Bros., S. Manning Sur. ... No report.

WALLER COUNTY

McDaniel and associates' No. 1 Citizens State Bank, B.B.B.&C. Sur., C of 150-acre tract ... No report.

SOUTH LOUISIANA

ASCENSION PARISH

McElroy Pet. Co.'s No. 2 Lacey, 150 ft. S, 150 ft. W of NE cor. of Sec. 29-10s-4e ... Fishing D.S. 4,560 ft.

CALCASIEU PARISH

Crawford Doyle's No. 1 Johnson, Sec. 33-9s-13w ... Shut down 875 ft.

Wilfred Lahay's No. 1 Jardell, Sec. 16-10s-12w ... Shut down 3,650 ft.

CAMERON PARISH

Brownie-Babbette Oil Co.'s No. 1 R. A. Moore, 562 ft. W, 50 ft. S of NE cor. E half SE of Sec. 18-12s-12w ... T.D. 5,678 ft; reaming.

EVANGELINE PARISH

Emile LeDeau's No. 1 Vidrine, 260 ft. W and 350 ft. S of NE cor. of Sec. 47-3s-2e ... Shut down 1,420 ft.

IBERIA PARISH

Warrick Oil Co.'s No. 1 Bernard, 912 ft. N and 150 ft. E of SW cor. Sec. 54-12s-7e ... Sand and shale showing 2,874-80 ft; cmtd. 6⅝-in. csg.

IBERVILLE PARISH

Standard Oil Co.'s No. 2 Myrtle Grove-Wilbert, Bayou Choctaw, 2,040 ft. N and 600 ft. W of C of Sec. 52-9s-11e ... No report.

Standard Oil Co.'s No. 2 Gay, Bayou Choctaw, 4,500 ft. N and 600 ft. E of SW cor. SE of Sec. 52-9s-11e ... Abd. in wtr. sand 6,294 ft.

PLAQUEMINES PARISH

Lake Washington-Freeport Sulphur Co.'s No. 1 Cockrell-Moran, Sec. 14-20s-26e, 3,442 ft. E and 46 ft. N of station ... Anhydrite 1,548 ft; D.S. stuck.

POINTE COUPEE PARISH

Grand Bay Oil & Gas Co.'s No. 1 Moniotte, 10,140 ft. S and 13,450 ft. E of NW cor. Twp. 5s-11 in Sec. 34.....Shut down 810 ft.

TERREBONNE PARISH

La. Gas & Fuel Co.'s No. 2 Minor, 3,450 ft. S and 1,980 ft. E of NW cor., Sec. 2-18s-16e .....T.D. 6,002 ft; plugged to 3,882 ft; fishing.

The Texas Company's No. 7 State-Lake Pelto, 2,216 ft. N, 104 ft. W of SE cor., Sec. 8-23s-18e .....Location.

Freeport Sulphur Co.'s No. 2 Wurzlow, Bay St. Elaine, 980 ft. S and 850 ft. W of NE cor. of Sec. 17-23s-18e..Abd.; sulphur test.

The Texas Company's No. 4 State-Lake Barre (D.D.), 1,900 ft. S and 600 ft. E of NW cor., Sec. 30-21s-20e..T.D. 3,660 ft.; pulling screen to deepen.

The Texas Company's No. 5 State, Dog Lake, 2,270 ft. S and 450 ft. E of NW cor. of Sec. 8-23s-18e .....Abd. in salt 4,085 ft.

The Texas Company's No. 10 State, Lake Barre .....Location.

The Texas Co.'s No. 14 State Lake Barre, 400 ft. S, 850 ft. W, NW cor. Sec. 30-21s-20e, in Sec. 37-21s-19e .....Cavity 1,342 ft.

The Texas Co.'s No. 16 State-Lake Barre, 1,500 ft. S, 150 ft. E of NW cor., Sec. 30-21s-19e .....Location.

VERMILION PARISH

Pure Oil Co.'s No. 2 Alliance Trust Co., 1,875 ft. E, 950 ft. S, NW cor., Sec. 34-11S-1w .....Set 23 ft. 7 in. of 5-in. screen, 4,039 ft. and 120½ ft. of liner with 3,873 ft. tubing; comp. flowing 38 bbls. per hr., 7/16-in. choke; 405 lbs. pressure; gravity 27.3°.

Pure Oil Co.'s No. 1 Mulvey Irrigation (Gueydan), 253 ft. S, 390 ft. E of No. 3 Alliance, in Sec. 34-11s-1w...Location.

WEST FELICIANA PARISH

Putnam Synd.'s No. 3 Come Plantation, Sec. 51-1s-14w...Shut down 2,449 ft.

WILDCAT OPERATIONS IN KANSAS

(Continued from Page 86)

Johnson Vickers' No. 1 Claussen, C SE NW Sec. 31-15-10w .....Drlg. 1,960 ft.

R. Gear et al's No. 1 Sanberth, C SW SE. Sec. 29-16-3w..S.D. 50 ft.

GRAHAM COUNTY

Schleimeyer et al's No. 1 Smith, SE Sec. 24-8-25w.....R.O.G.

GREENWOOD COUNTY

York State's No. 1 Lifebare, NE NW NE Sec. 14-23-11...Location.

VINNEY COUNTY

National Ref. Co.'s No. 1 Wells, C SW, Sec. 13-23-26w...Drlg. 4,985 ft.

HARVEY COUNTY

D. R. Louck's No. 1 Regier, SW SE NW, Sec. 9-22-3w...Drlg. 2,400 ft.

J. Liggett et al's No. 1 Vessel, NE SW, Sec. 2-23-3w...Location.

Liggett et al's No. 1 Davis, SW SE NE, Sec. 7-24-1.....S.D. 2,500 ft.

KINGMAN COUNTY

Panhandle Drlg. Co.'s No. 1 Wetheral, C SE NW SW, Sec. 20-28-10w .....12-in. csg. 1,610 ft.; S.D.

McPHERSON COUNTY

Snydar et al's No. 1 Carlson, SE cor. Sec. 4-19-2w .....Location.

Detrick's No. 1 Dalke, NW SE Sec. 16-19-1 .....S. D. 50 ft.

Sidwell et al's No. 1 Nichols, NE NW NW Sec. 28-17-1w.Location.

Simmons-Canary's No. 1 Krehbiel, SE NW Sec. 33-18-1w.Drlg. 1,165 ft.

Detrich et al's No. 1 Sinclair, SE SW, Sec. 25-19-1w.....Drlg. 3,135 ft.; chat 2,926-60 ft.; show oil and gas.

MORTON COUNTY

Hydraulic Oil Co.'s No. 1 State Land, NW SE, Sec. 22, 34-42w .....T.D. 3,640 ft.; temp. abd.

MORRIS COUNTY

Urschel et al's No. 1 Bersuch, NW SE NW, Sec. 10-17-7..S.D. 915 ft.

NORTON COUNTY

Richards et al's No. 1 Colby, Sec. 17-4-21w .....Rig.

OSAGE COUNTY

Briggs & Smith's No. 1 Wood, SE NW, Sec. 21-14-15.....S.O. 2,190-2,200 ft.; temp. abnd.

PHILLIPS COUNTY

Hall et al's No. 1 Donaldson, C NE NE, Sec. 25-5-18w...Drlg. 3,345 ft.

PRATT COUNTY

Minnescah O. & G. Co.'s No. 1 Hardesty, SW SE SE, Sec. 28-27-11w .....Rig.

RAWLINS COUNTY

J. G. Durham et al's No. 1 Weaver, SE cor., Sec. 3-3-35w..S.D. 3,925 ft.

RENO COUNTY

National Union's No. 1 Hill, NE SE Sec. 18-24-4w.....Location.

Martin et al's No. 1 Yadu, C NW NW, Sec. 15-24-5w....S.D. 318 ft.

Jarvis & Wright's No. 1 Rainbow, NW SE, Sec. 32-23-7w..T.D. 3,966 ft.; P.B. to 3,536-61 ft.; shot 100 qt.; C.O.

RICE COUNTY

Langston et al's No. 1 Wells, NE SE Sec. 4-20-9w .....Rig.

R. Ramsey's No. 1 Hutton, SW NE SW Sec. 6-20-9w....Rig.

Slick et al's No. 1 Arth, SE NE Sec. 27-18-10w.....Drlg. 700 ft.

J. Liggett et al's No. 1 Thodel, C NW NW, Sec. 11-21-7w.S.D. 50 ft.

RUSSELL COUNTY

J. Brennan's No. 1 Waly, CNL E½ NW, Sec. 29-13-11w..Rig.

RUSH COUNTY

Skelton et al's No. 1 Brock-Hartman, SW SE NE, Sec. 4-18-16w .....S.D. 50 ft.

SALINE COUNTY

Twin Mounds Oil Co.'s No. 1 Wells, C W½ NE NW, Sec. 20-13-4w .....T.D. 3,100 ft.; U.R. 6-in. csg. from 3,021 ft.

SEDGWICK COUNTY

Milly et al's No. 1 Jones, SW cor. Sec. 26-27-1 .....Drlg. 1,175 ft.

Scroggins et al's No. 1 Bartlett, NW SE NW Sec. 35-27-1 .....Rig.

Tulsa Oil Co.'s No. 1 Levert, C SE SW, Sec. 8-28-2w....Drlg. 2,720 ft.

SHERIDAN COUNTY

Flo et al's No. 1 Shoemaker, SE SW, Sec. 27-7-26w.....C.O. 4,520 ft.

STEVENS COUNTY

Argus Prod.'s No. 2 Christopher, C NE, Sec. 10-33-39w..S.D. 5,531 ft.

SUMNER COUNTY

Treos Oil Co.'s No. 1 Tompkins, SW, Sec. 26-32-1.....Location.

Treos Oil Co. and Shell's No. 1 Springate, NE SE SW, Sec. 6-34-2 .....Drlg. 3,639 ft.

WILDCAT OPERATIONS IN LOUISIANA-ARKANSAS

(Continued from Page 88)

H. W. Perritt's No. 1 Cook, 165 ft. E, 195 ft. N, SW cor. NE SW, Sec. 8-8-9.....Arranging to set 6-in. 2,373 ft.

H. W. Perritt's No. 2 Brown Lbr. Co., 300 ft. N and W, from center Sec. 29-8-9 .....S.D. 1,670 ft.

Texana Oil Co.'s No. 1 Clark-Morris Lbr. Co., 878 ft. N, 580 ft. E. C, Sec. 33-5-6 .....Washing to bottom 2,504 ft.

OUACHITA PARISH

Wilson & Mitchell's No. 1 Williams, Sec. 5-16-1e, 330 ft. E, 240 ft. S, NW cor. SW SE.....S.D. 3,285 ft.

RED RIVER PARISH

C. F. Davis' No. 1 Pierson, 500 ft. S, 917 ft. E, NW cor. SW NW, Sec. 12-14-11.....Location.

Lawrence Decker, tr.'s No. 1 Madden, 1,450 ft. S and W, NE cor., Sec. 21-14-10 .....Derrick.

La. Oil Dev. Co.'s No. 1 La. Delta Pecan Co., 3,950 ft. S, 300 ft. E, NW cor., Sec. 27-12-11.....Spudded and S.D. 50 ft.

RICHLAND PARISH

National Gas Co.'s No. 1 Singletary, 1,980 ft. N, 660 ft. W, SE cor., Sec. 20-18n-7e.....S.D. 2,515 ft.

SABINE PARISH

Adams & Roberson's No. 1 Peterson, 406 ft. N, 300 ft. W, SE cor. NE NE, Sec. 35-8-13 .....Derrick.

J. H. Askew's No. 1 Sabine Lbr. Co., NE NE, Sec. 9-7-13..Set 6-in. 2,002 ft.

R. W. Boulding's No. 1 Williams, Sec. 17-7-10, 300 ft. S and E, NW cor. SW NE.....S.D. for wtr. 1,200 ft.

J. M. Bridges' No. 1 Armstrong, 360 ft. N, 320 ft. E, SW cor. SE, Sec. 28-10-11.....Reaming to test; T.D. 3,390 ft.

Broderick & Calvert's No. 1 Costello, Sec. 2-7-14, 275 ft. S, 150 ft. W, NE cor. SE NW.....S.D. 150 ft.

R. E. Brooke's No. 1 A. Gray, 330 ft. N and W, SE cor. SW NE, Sec. 35-8-13 .....Location.

F. M. Burke's No. 1 Gray, 454 ft. N, 365 ft. W, SE cor. SW SW, Sec. 3-7-13 .....Derrick.

Bob Chew's No. 1 O. Gray, 330 ft. N and E, SW cor. SW NW, Sec. 35-8-13 .....Location.

Cliff Oil Co.'s No. 1-A Martinez School, 720 ft. N, 105 ft. W, SE cor. NE SE, Sec. 4-7-12 .....Set 10-in. 100 ft.

W. M. Coates' No. 1 Stille, 330 ft. N, 660 ft. W, SE cor., Sec. 35-8-13 .....Set 6-in. 2,026 ft.

W. M. Coates' No. 1 Gray, 330 ft. N and W, SE cor. SW, Sec. 3-7-13 .....Location.

W. M. Coates' No. 2 Gray, 330 ft. S and W, NE cor. SE SW, Sec. 3-7-13 .....Location.

Coates Pet. Co.'s No. 2 Stille, 330 ft. N and E, SW cor. SE SW, Sec. 35-8-11 .....Set 10-in. 100 ft; drlg. 455 ft.

Coates Pet. Co.'s No. 3 Stille, 330 ft. N and E, SW cor., Sec. 35-8-13 .....Location.

The Coming Oil Co.'s No. 1 Cobb, 330 ft. N and E, SW cor., Sec. 14-7-11 .....Derrick.

Covington, Clark & Fullilove's No. 1 Bill Bray, 200 ft. N and W, SE cor. SE NW, Sec. 32-7-11 .....Derrick pattern.

Craig et al's No. 1 Travis, Sec. 13-7-11, 200 ft. S and E, NW cor. SE NW .....Waiting on csg. 2,450 ft.

Crescent Drlg. Co.'s No. 1 Williams, 370 ft. E, 330 ft. S, NW cor. N½ SW, Sec. 21-7-12 .....Location.

Crescent Drlg. Co.'s No. 2 Williams, 330 ft. S and W, NE cor. SE NW, Sec. 21-7-12 .....Location.

Mark Curtis et al's No. 1 Sabine Lbr. Co., 330 ft. N and W, SE cor. NE SE, Sec. 35-8-13 .....Derrick.

R. E. Davidson's No. 1 Davis, 600 ft. S, 125 ft. E, NW cor., Sec. 28-7-11 .....Derrick.

B. A. Ferrell's No. 1 Haley, Sec. 6-7-12, 300 ft. S and E, NW cor. NW SW.....Set 6-in. 2,046 ft.

Harry Flinchbaugh's No. 1 Sepulbedo, 250 ft. N and E, SW cor. SE NE, Sec. 4-7-13 .....Location.

R. L. Gay, tr.'s No. 1-A Long Bell Lbr. Co., 430 ft. S, 200 ft. W, NE cor. NW NW, Sec. 10-8-13.....Coring 5,628 ft.

R. L. Gay, tr.'s No. 11 Bowman-Hicks, 330 ft. N and W, SE cor. NE NE, Sec. 14-7-14 .....Set 10-in. 103 ft.

J. I. Hall's No. 1 Williams, SE NW, Sec. 3-7-10.....S.D. 2,831 ft.

Vick Hammond's No. 1 Eszernack, SE cor. NW SW, Sec. 3-7-13 .....Location.

W. N. Hankins' No. 1 Tilley, 200 ft. E, 30 ft. S, NW cor. SE SE, Sec. 30-8-12 .....Derrick.

D. Holcomb's No. 1 Petty, 330 ft. S and W, NE cor. SW SW, Sec. 13-7-11 .....Testing 2,626 ft.

Howard et al's No. 1 Williams, 300 ft. N and E, SW cor. SE NW, Sec. 13-7-11 .....Derrick.

Ab Jones' No. 1 Garcia, 200 ft. S and W, NE cor. NW SE, Sec. 4-7-13 .....Derrick pattern.

G. E. Jordan's No. 1 Dew, 330 ft. N, 340 ft. E, SW cor. SW SE, Sec. 34-8-11 .....Location.

J. J. Keen, tr.'s No. 1 Belton (no check), Sec. 31-8-13...Pulling 6-in. csg. 3,128 ft.

A. D. King, tr.'s No. 1 Davis, 170 ft. N, 410 ft. E, SW cor. NW NE, Sec. 29-7-11 .....Location.

A. D. King, tr.'s No. 1 Germain, Sec. 7-7-10, 330 ft. E, 518 ft. N, SW cor. NE NE.....S.D. for wtr. 1,630 ft.

A. D. King, tr.'s No. 1 T. L. Andries, 200 ft. S, 300 ft. E, NW cor. SE SE, Sec. 15-7-11 .....Derrick pattern.

A. D. King, tr.'s No. 1 J. J. Andries, 140 ft. S, 240 ft. W, NE cor. SE SW, Sec. 15-7-11 .....Set 6-in. 2,370 ft.

M. J. Kissick's No. 1 Buvins, 570 ft. S, 14 ft. W, NE cor., Sec. 20-7-11 .....Testing 2,640 ft.

W. F. Lacey's No. 3 McNeely, Sec. 14-7-11, 300 ft. S and E, NW cor. NE NE .....Set 6-in. 2,430 ft.

S. A. Lane et al's No. 1 DeKeyser, 233 ft. E, 330 ft. S, NW cor. NE, Sec. 23-7-11 .....Rigging up.

Geo. LeGrand's No. 1 McGough, Sec. 3-8-10.....Drlg. 1,000 ft.

Lowery & Greene's No. 1 Martinez, 330 ft. N and W, SE cor., Sec. 34-8-13 .....Set 6-in. 2,032 ft.

Maya et al's No. 1 Delong, Sec. 5-7-10, 275 ft. N, 175 ft. W, SE cor. SE SW.....Derrick pattern.

Hill Myers' No. 1 Garcia, 200 ft. N and W, SE cor. SW NW, Sec. 4-7-13 .....Set 10-in. 100 ft.

E. F. Neely's No. 1 Cobb & Alford, Sec. 14-7-11, 200 ft. S. 100 ft. E, NW cor. NE SW.....W.O.S.R. 2,565 ft.

E. F. Neely's No. 1 Rains, 660 ft. N, 100 ft. W, SE cor., SW NW, Sec. 14-7-11 .....S.D. 2,541 ft.

C. D. Neff, tr.'s No. 1 Snell, Sec. 9-7-11, 350 ft. N, 660 ft. W, SE cor. Sec. .....W.O.S.R. 2,509 ft.

C. D. Neff, tr.'s No. 1 Peterson, 200 ft. N and E, SW cor. NW NW, Sec. 26-8-13 .....Drlg. 150 ft.

Palmer & Smitherman's No. 1 La. Long Leaf Lbr. Co., Sec. 12-7-11, 330 ft. S and E, NW cor. NE SE.....Location.

Palmer & Smitherman's No. 2 La. Long Leaf Lbr. Co., 330 ft. S and W, NE cor. SE, Sec. 12-7-11.....Location.

Palmer & Smitherman's No. 3 La. Long Leaf Lbr. Co., 330 ft. S and W, NE cor. NE SW, Sec. 12-7-11.....Dry and abd. 2,680 ft.

Pelican Nat. Gas Co.'s No. 3 Sabine Lbr. Co., 330 ft. S and W, NE cor. NE SW, Sec. 3-7-13 .....Flowing 1,000 bbls. 2,370 ft.

H. W. Perritt's No. 1 Brown Lbr. Co., Sec. 4-7-10, 330 ft. N and E, SW cor. SW SE .....S.D. 2,762 ft; W.O.

Roy Raines et al's No. 1 Beard, 720 ft. E, 700 ft. N, SW cor. SW SE, Sec. 3-8-10.....Derrick.

F. G. Reed et al's No. 1-A McNeely, 300 ft. N and E, SW cor. NW NE, Sec. 14-7-11.....Comp. pumping 20 bbls. 2,502 ft.

Sabine Prod. Co.'s No. 1 Sabine Lbr. Co., 330 ft. S and W, NE cor. NW SE, Sec. 3-7-13 .....W.O.S.R. 2,394 ft.

Skully & Beach's No. 2 Lafitte, 149 ft. S, 328 ft. E, NW cor., Sec. 13-7-11 .....Location.

H. R. Smith et al's No. 1 La. Long Leaf Lbr. Co., Sec. 12-7-11, 330 ft. S and W, NE cor. NW SW.....Location.

W. W. Smith et al's No. 1 Sepulbedo, 330 ft. N, 350 ft. W, SE cor., Sec. 4-7-13 .....Location.

Sneed & Sneed's No. 1 Pearce, 300 ft. N, 215 ft. E, SW cor. NE SW, Sec. 35-8-13 .....Derrick.

Southland Drlg. Co.'s No. 1 Frost Lbr. Co., 330 ft. N and W, SE cor. NE NE, Sec. 13-9-11.....Set 12½-in. 103 ft.

Southland Drlg. Co.'s No. 2 F. Martinez, 330 ft. N and W, SE cor. W½ SE, Sec. 34-8-13 .....Derrick.

State Prod. Co., Inc.'s No. 1 Davis, Sec. 17-7-10, 150 ft. N and E, SW cor. SW NW.....Drlg. shale 2,612 ft.

State Prod. Co., Inc.'s No. 1-B Davis, 200 ft. N and E, SW cor., Sec. 17-7-10 .....Derrick pattern.

Supreme Oil Co.'s No. 1 Pruitt, 330 ft. N and E, SW cor. SE SW, Sec. 30-8-11 .....Derrick.

B. E. Taylor's No. 1 Gay, 232 ft. S, 476 ft. E, NW cor. SE SW, Sec. 26-8-13 .....Location.

B. E. Taylor's No. 1 Wooley, 330 ft. N and E, NW cor. SE SW, Sec. 26-8-13 .....Location.

A. F. Tarver's No. 2 Cutrer, Sec. 12-7-11, 1,120 ft. E, 300 ft. N, SW cor. NW.....W.O.S.R. 2,600 ft.

C. H. Tuttle's No. 3 Byrd, 130 ft. S, 124 ft. E, NW cor., Sec. 7-7-10 .....Set 10-in. 100 ft; drlg. 300 ft.

C. C. Walker's No. 1 Noble-Neely, 330 ft. S and E, NW cor. SW, Sec. 36-8-13 .....Derrick.

Williams & Spiers' No. 1 Williams, Sec. 21-8-10, SE cor. SE SW.....S.D. for wtr. 790 ft.

TENSAS PARISH

A. R. Willis et al's No. 1 Currey, 1,320 ft. S, 1,320 ft. E, NW cor., Sec. 39-11-12.....S.D. 2,545 ft.

VERNON COUNTY

Liano Co-operative Colony's No. 1 fee, NW NE, Sec. 34-2n-9w .....Location.

ARKANSAS

ASHLEY COUNTY

D. S. Brooks, Inc.'s No. 1 Cressett Lbr. Co., 330 ft. N and E, SW cor. SW SE, Sec. 31-15s-6w.....Drlg. 3,405 ft.

COLUMBIA COUNTY

Kendall Oil Co.'s No. 1 Fullenwelder, Rhea & Kitchen, Sec. 13-17-22 .....S.D. 814 ft.

CLAY COUNTY

S. C. Jeffus' No. 1 Underwood, 510 ft. N, 350 ft. W. C, NW SE, Sec. 4-20-3 .....S.D. 1,350 ft.

CLEVELAND COUNTY

Crum & Stillwell's No. 1 E. R. Bell, Sec. 10-10s-13.....Rigged up and S.D.

CLEBURNE COUNTY
(Cable tools)

Donnelly-Craver et al's No. 1 Donophan Lbr. Co., SE cor. NW, Sec. 33-11-9 .....S.D. 3,740 ft.

CRAWFORD COUNTY

Ozark Nat. Gas Co.'s No. 1 C. E. Jones, 660 ft. N, 372 ft. E, SW cor. SE SW, Sec. 32-9-31.....Dry and abd. 2,552 ft.

DALLAS COUNTY

J. H. James, tr.'s No. 1 Fordyce Lbr. Co., 200 ft. S, 200 ft. E, NW cor. SE, Sec. 11-9-15.....S.D. 2,575 ft.

Zepp O. & G. Co.'s No. 3 Hillman, Sec. 29-10-13, 180 ft. N, 450 ft. E, SW cor. NW NE.....Location.

DREW COUNTY

Co-Operative Dev. Co.'s No. 1 Ogles, Sec. 35-15-5, 330 ft. S and E, NW cor. NE NW.....Coring sandy lime 2,205 ft.

HOT SPRINGS COUNTY

Star Oil Co.'s No. 1 Cunningham, 285 ft. S, 285 ft. W, NE cor., Sec. 11-5-16.....S.D. 1,306 ft.

LINCOLN COUNTY

Lawrence Cook, tr.'s No. 1 McGhee Planting Co., 420 ft. S, 200 ft. W, NE cor. NE SW, Sec. 5-8-7.....S.D. 2,800 ft.

LITTLE RIVER COUNTY

Roberts Oil Co.'s No. 1 H. J. Russell, 330 ft. E, 330 ft. S, NW cor., Sec. 25-13-19.....Location.

LOGAN COUNTY

J. H. Flowers' No. 1 J. H. White, Sec. 13-6-26.....S.D.; W.O. 3,670 ft.

MILLER COUNTY

C. E. Litchfield's No. 1 Hervey, 525 ft. S, 350 ft. W, NE cor. NE NW, Sec. 2-15-26.....T.A. 2,885 ft.

Fitzwater et al's No. 1 Beck, Sec. 32-15-26.....Coring shale 2,920 ft.

W. E. Noel et al's No. 1 Dickson hrs., 1,980 ft. W, 660 ft. S, NE cor., Sec. 11-20-27.....S.D; W.O. 2,600 ft.

OUACHITA COUNTY

Copenhaven et al's No. 2 Berg, C SE SE, Sec. 13-15-17..W.O.S.R. 2,208 ft.

McLean et al's No. 1 L. D. Neely, Sec. 23-15-16, 200 ft. N and W, SE cor. NE SW.....S.D. 102 ft.

Chas. Steele et al's No. 1 Anderson, 155 ft. S, 150 ft. E, from center Section 36-12-18 .....Rigging up.

PIKE COUNTY

E. R. Henderson's No. 1 Tilyou, 660 ft. W, 500 ft. S, NE cor. NE SE, Sec. 26-8-14.....T.A. 2,909 ft.

E. R. Henderson's No. 1 J. L. Lee, 400 ft. S, 350 ft. E, NW cor. SW SE, Sec. 31-8-24.....S.D.; W.O. 1,020 ft.

E. R. Henderson's No. 1 W. B. East, 200 ft. S, 150 ft. W, NE cor., Sec. 13-9-23..... Skidding over; to drill new hole.

PRAIRIE COUNTY

Powell Creek O. & G. Co.'s No. 1 Kloss, NE SW, Sec. 3-4n-6w .....Partly rigged up and S.D.

SCOTT COUNTY

Heavener O. & G. Co.'s No. 1 Riser, Sec. 36-4-26.....Abd. 1,436 ft.

Waldron O. & G. Co.'s No. 1 White, NE cor. SW NW, Sec. 17-3n-29 .....S.D. 1,860 ft.

SEVIER COUNTY

Tristate Oil Co.'s No. 1 Grimble, Sec. 34-8-32, S½ SW...S.D. 950 ft.

ST. FRANCIS COUNTY

Field & Jones' No. 1 F. M. White, Sec. 1-4n-3e, SW cor. NW .....S.D. 700 ft.

UNION COUNTY

Drillers Oil & Dev. Co.'s No. 1 Pickering, 220 ft. N, 668 ft. E, SW cor. NW NE, Sec. 1-17-16.....Dry and abd. 2,300 ft.

H. H. Helms' No. 1 C. H. Murphy, NE cor. NW NE, Sec. 31-16-14 .....S.D. 2,875 ft.

Pigeon Hill Oil Co.'s No. 1 Union Sawmill Co., 330 ft. S and W, NE cor. NW SW, Sec. 19-17-12.....Drlg. 3,482 ft.

Wilson & Chapman's No. 1 King, Sec. 3-18-13, 330 ft. N and E, SW cor. NE NE .....Derrick.

Wilson & Chapman's No. 1-A D. Norman, 330 ft. S and E, NW cor. N½ NE SE, Sec. 3-18-13..... S.D. 1,673 ft.

WASHINGTON COUNTY
(Cable tools)

C. H. Willoughby's No. 1 Jones, Sec. 34-16-30.....S.D. 1,795 ft.

YELL COUNTY
(Cable tools)

Tegmeier & Lockett's No. 1 Falcon, Sec. 36-7-21.....S.D. 5,710 ft.

EAST TEXAS

BOWIE COUNTY

Logan & Elliott's No. 1 Smith, 9,600 ft. S, 2,500 ft. W, NE cor. Chas. Lewis Sur. .....S.D. 4,505 ft.

Lanford et al's No. 1 W. W. Whybark, 200 ft. S, 300 ft. W, SW cor. J. H. Dyer Sur. .....S.D. 1,792 ft.

Lee Timberlake et al's No. 2 Tidwell, 2,510 ft. N, 665 ft. W, SE cor. T. M. Rice Sur. .....S.D. 3,000 ft.

CASS COUNTY

Davis & Pigg's No. 1 Roy Bryan, SW cor. Roy Bryan 88-ac. tr., Albert H. Lattimer Sur. .....S.D. 2,360 ft.

C. E. Murdock's No. 1 First National Bank, Evans Watson Sur. .....S.D. 4,390 ft.

John C. Rogers' No. 1 I. E. Lanier, 573 ft. N, 879 ft. W, SE cor. Lanier 86 ac. in K. E. Welborn Sur. ....S.D. 2,280 ft.

John C. Rogers et al's No. 1 W. Q. Henderson, 3,100 ft. S, 3,100 ft. E, NW cor., Wm. Davis Sur. .....S.D. 960 ft.

HARRISON COUNTY

Lloyd Oil Corp.'s No. 1 E. S. Timmons, 150 ft. from N line to 350 ft. from E line of 105-ac. tr., Findley Sur. .....S.D. 4,195 ft.

M. E. Nash et al's No. 1 Henderson, G. L. Bledsoe Sur...Set 10-in. 35 ft.

Ryan Cons. Pet. Corp.'s No. 1 J. M. Fuhr, 1,300 ft. N of NW cor. T. J. Copelin Sur., 1,675 ft. SW at right angles to NW SE line of O'Neal Sur. .....Derrick.

Triangle Drlg. Co.'s No. 1 Platt, 1,125 ft. W, 1,995 ft. N, SE cor. F. C. Barker Sur. .....Location.

MARION COUNTY

Baunoch Dev. Co.'s No. 1 Miller, 735 ft. N, 1,470 ft. E, SW cor. H. Fulgram Sur. (was Gist, Claunch & Dodson) .....T.A. 4,120 ft.

Geo. Hindeman et al's No. 1 F. W. Lindsey, 2,500 ft. S. most northerly N line, 3,555 ft. E most easterly W line, Alexander Albright Sur. .....S.D. 2,380 ft.

M. M. Howard's No. 1 Hussey, Chas. Lockhart Sur. .....Junked and abd. 600 ft.

Purcell et al's No. 1 Coker, M. Reed Sur. .....S.D. 1,957 ft.

PANOLA COUNTY

Moses & Wallace's No. 1 Daniel, 600 ft. N and W lines, Mrs. Gerrell 100-ac. tr., SW cor. Isabel Hanks Sur...S.D. for D.S. 740 ft.

J. L. Nelson et al's No. 1 J. Williams, 300 ft. S, 700 ft. W, NE cor. Williams' 67-ac. tr. in James Hanks Sur. .....S.D. 3,055 ft.

SHELBY COUNTY

K. H. Francis' No. 1 John Mims, Mary Smith Sur. .....Skidding over for new hole.

General Minerals Co.'s No. 2-B Holt, Matthew Moore Sur. S.D. 3,951 ft.

General Minerals Co.'s No. 2 Pickering Lbr. Co., 600 ft. N, 400 ft. E, SW cor. D. S. Height Sur. .....S.D. 2,530 ft.

Henry Maulding's No. 1 Frost Lbr. Co., NE cor. Frost Lbr. Co.'s 20-ac. tr., A. D. Fountain Sur. .....Skidding over for new hole.

McRoby et al's No. 1 Windham, Wm. Leach Sur., on Windham 396-ac. tr. .....Pulling 6⅝-in. csg. 3,393 ft.

Ridgeway et al's No. 1 Polley, Domingues Gonzales Sur., 3,180 ft. E of SW cor., 160 ft. N at right angles of Polley 457-ac. tr. .....Set 8-in. 1,937 ft; T.D. 1,949 ft.

Sadberry et al's No. 1 Pickering Lbr. Co., 660 ft. N, 400 ft. E, SW cor. Jane Stoddard Sur. .....S.D.; W.O. 1,768 ft.

C. H. Tautenhahn's No. 1 J. C. Bogard, 300 ft. S, 900 ft. E, NW cor. J. C. Bogard's 52-ac. tr., Thomas Baker Sur. .....S.D. 20 ft.

Western World's No. 1 Foster, Billingsby-Jeremiah Bowlin Sur. .....S.D. 2,940 ft.

Wray & Dunbar's No. 1 C. A. Hayden, 600 ft. N and W SE cor. 153-ac. tr. in D. T. F. Yordt Sur. .....Coring 1,583 ft.

LOUISIANA-ARKANSAS PROVEN AREAS

NORTH LOUISIANA

CADDO PARISH—PINE ISLAND

Company, well, farm name, section and block— Remarks:

Calatex O. & G. Co.'s No. 1 Scott, Sec. 5-16-16, 1,320 ft. E, 300 ft. N, SW cor. .....Comp. 1,000,000 ft. gas 2,952 ft.

Simplex Oil Co.'s No. 1 Youree-Glassell, 500 ft. N and E, C, Sec. 13-20-15.....Cmtd. back to 2,272 ft.

OUACHITA PARISH

Carbon Con.'s No. 7 Guthrie, Sec. 50-20n-4e, 5,263 ft. N, 7,475 ft. W of cors. of Secs. 25, 26 and 49, in Sec. 50 .....Location.

SABINE PARISH—ZWOLLE

O. J. Baird's No. 2 Duggan, Sec. 14-7-11, 200 ft. S and E from cen. Sec. .....W.O.S.R. 2,509 ft.

Baird Bros.' No. 1 S. Martines, 122 ft. E, 476 ft. S, NW cor. NE SW, Sec. 2-7-13 .....Set 10-in. 100 ft; drlg. 1,500 ft.

W. M. Coates' No. 1 LaRoux, 330 ft. N and E, SW cor. SE, Sec. 36-8-13 .....Derrick.

W. M. Coates' No. 1 Nulton, 224 ft. E, 330 ft. S, NW cor. SW NW, Sec. 1-7-13 .....Set 10-in. 101 ft; set 6-in. 2,080 ft.

Dengall O. & G. Co.'s No. 1 E. Nulton, 224 ft. E, 330 ft. N, SW cor. NW NW, Sec. 1-7-13.....W.O.S.R. 2,324 ft.

Dengall O. & G. Co.'s No. 1-F Nulton, 330 ft. S and E, NW cor. SW NW, Sec. 2-7-13.....Location.

Dengall O. & G. Co.'s No. 1-G Nulton, 350 ft. N, 330 ft. W, SE cor. NE NE, Sec. 2-7-13.....Drlg. 2,355 ft.

Depression Oil Co.'s No. 1 Peters, 355 ft. N, 340 ft. W, SE cor. SW SW, Sec. 11-7-11.....Waiting orders 2,558 ft.

M. L. Friend's No. 1 Eisernack, 250 ft. N, 330 ft. W, SE cor. N½ NE NE, Sec. 2-7-13 .....Dry and abd. 2,525 ft.

J. E. Grandstaff's No. 1 Johnson, S½ SW SW, Sec. 2-7-11.S.D. 2,020 ft.

Lionel Hawkins' No. 2 Newton, 796 ft. N, 336 ft. E, SW cor. NE SE, Sec. 1-7-11 .....Location.

Zeke Lohman's No. 1 McCormick, 660 ft. E, 330 ft. N, SW cor. NE SW, Sec. 2-7-11.....Dry and abd. 2,680 ft.

Loring Oil Co.'s No. 18 Bowman-Hicks, 1,280 ft. S, 275 ft. E, NW cor. SW NW, Sec. 15-7-12.....Coring lime 5,190 ft.

Ben Merritt, tr.'s No. 1 Nulton, 400 ft. S and W, NE cor. SW NE, Sec. 3-7-13 .....Set 10-in. 103 ft; drlg. 1,312 ft.

Pelican Nat. Gas Co.'s No. 11 La. Long Leaf Lbr. Co., Sec. 10-7-11, 330 ft. N and W, SE. cor. NE NW.....W.O.S.R. 2,592 ft.

Pelican Nat. Gas Co.'s No. 13 La. Long Leaf Lbr. Co., 330 ft. N and W, SE cor. NE SE, Sec. 9-7-11.....Flowing 150 bbls. 2,432 ft.

F. G. Reid's No. 1-B McNeely, 400 ft. S, 110 ft. W, NE cor. NE NW, Sec. 14-7-11 .....Set 6-in. 2,385 ft.

C. T. Ruffian's No. 1 Lilley, 300 ft. S and W, NE cor. NW, Sec. 8-7-11 .....Set 6-in. 2,325 ft.

Sabine Prod. Co.'s No. 3 Pearce, Sec. 10-7-11, 330 ft. S and E, NW cor. SE NW.....S.D.; W.O. 2,699 ft.

Ben F. Smith's No. 1 fee, 330 ft. S, 400 ft. E, NW cor. Sec. 4-7-11 .....Derrick.

F. E. Stancil's No. 1 Pouder, 273 ft. S, 397 ft. E, NW cor. NE SE, Sec. 10-7-11 .....Set 10-in. 100 ft; coring 1,358 ft.

F. E. Stancil's No. 2 Pouder, 805 ft. N, 283 ft. E, SW cor. SE SE, Sec. 10-7-11 .....Location.

UNION PARISH

Interstate Nat. Gas Co.'s No. 2 Steele, 1,980 ft. W, 660 ft. N, SE cor., Sec. 26-20-3e.....Rigging up.

Interstate Nat. Gas Co.'s No. 3 Steele, 660 ft. S and E, NW cor. NE, Sec. 26-20-3e.....Location.

Southern Carbon Co.'s No. 59 fee, 660 ft. N, SE SW

ARKANSAS

UNION COUNTY—EL DORADO

Southern Prod. Co.'s No. 1 Wingfield, NE cor. SE NW, Sec. 16-19-15 .....Cored S.W. sand 4,512 ft.

UNION COUNTY—URBANA

Marine Oil Co.'s No. 1 Winn est., 330 ft. S and E, NE cor. S½ NW, Sec. 11-18-13.....T.A. 3,536 ft.

Marine Oil Co.'s No. 2-E Thompson, 330 ft. N, 330 ft. E, SW cor. NE NE, Sec. 10-18-13.....Location.

Wilson & Chapman's No. 1-B Hadley, Sec. 3-18-13, 330 ft. S and W, NE cor. SE NW.....T.A. 3,545 ft.

Wilson & Chapman's No. 2 Emily King, Sec. 3-18-13, 150 ft. S, 150 ft. E, NW cor. NE NE.....S.D. 1,730 ft.

EAST TEXAS

PANOLA COUNTY

Daisy O. & G. Co.'s No. 1 Rucks, John Palmer Sur. .....S.D. 3,276 ft.

United Prod. Corp.'s No. 17 Steele, 1,320 ft. N, 660 ft. W, SE cor. C. D. Steele lse., in B. C. Jordan Sur. ....Location.

MISSISSIPPI

HINDS COUNTY

McGuire et al's No. 1 Spring Lake, Sec. 11-5n-1e, 250 ft. N, 450 ft. W, from center of Sec. .....T.A. 2,487 ft.

RANKIN COUNTY

Meredith-Smith et al's No. 3 Strawder, 400 ft. S, 750 ft. W, NE cor., Sec. 13-5n-1e.....Drlg. 550 ft.

Muse-Muse & Love's No. 1 Bradley, 800 ft. W, 400 ft. N, SE cor. SW, Sec. 11-5n-1e .....Set 10-in. 120 ft; set 6-in. 2,448 ft.

Owen & Weaver's No. 1 Fitzhugh, 1,740 ft. E, 225 ft. N, SW cor., Sec. 1-5n-1e.....Comp. 15,000,000 ft. gas 2,394 ft.

WILDCAT OPERATIONS IN MISSISSIPPI

CLARKE COUNTY

Company, well, farm name, section and block— Remarks:

F. X. Gowans et al's No. 1 Elfring, SE NE, Sec. 12-1n-14e. Waiting on 10-in. csg. 150 ft.

HINDS COUNTY

Atkins et al's No. 1 Crane Lawrence, Sec. 23-6n-1e, 300 ft. E, 132 ft. N, SW cor. NE SE.....Arranging to set 6-in. csg. 2,485 ft.

Miss.-Minn. Oil Co.'s No. 1 Edwards Land Co., Sec. 23-6n-4w, 1,200 ft. N and E from center of Sec. .....S.D. for wtr. 2,922 ft.

JASPER COUNTY

Bay Springs Pet. Co.'s No. 1 Keyes, C NW NE, Sec. 2-12-9 .....T.A. 3,403 ft.

LAMAR COUNTY

Stauffer & Kouri's No. 1 Bond, SE NE, Sec. 18-2n-14w..S.D.; W.O. 1,090 ft.

LOWNDES COUNTY

Lowndes County Oil & Dev. Co.'s No. 1 Carr est., Sec. 34-17-16e, 1,320 ft. E, 330 ft. S, NW cor. Sec. .....Tested dry 1,045 ft; drlg. 1,075 ft.

NEWTON COUNTY

Bob Dalton's No. 1 Majure, 460 ft. N, 300 ft. E, SW cor. SE, Sec. 25-6n-11e.....S.D. 840 ft.

NOXUBEE COUNTY

Thompson & Donohue's No. 1 Donohue, Sec. 25-14n-17e..S.D. 1,735 ft.

RANKIN COUNTY

James Alexander, tr.'s No. 1 Holmes, 445 ft. E, 375 ft. N, SW cor. NW, Sec. 31-6n-2e .....Rigging up.
Majestic O. & G. Co.'s No. 1 Elton Lbr. Co., Sec. 16-4n-3e. Derrick.
Orr et al's No. 1 Hanna, Sec. 14-5n-1e, 500 ft. E, 350 ft. S, NW cor. SW.....S.D. cor csg. 2,369 ft. (corrected).

SCOTT COUNTY

M. U. Culley et al's No. 1 Owens, Sec. 2-5-9.....S.D. 190 ft.

WARREN COUNTY

Eagle Bend O. & G. Co.'s No. 1 Kiger, SW cor. SW SE, Sec. 9-18-2 ..... S.D. 2,607 ft.

WILDCAT OPERATIONS IN ALABAMA

CLARKE COUNTY

Company, well, farm name, section and block—	Remarks:
Tidal Oil Co. et al's No. 1 Hobson, Sec. 33-6n-2e.....	Reaming to bottom 2,435 ft.

LAMAR COUNTY

DeSoto O. & G. Corp.'s No. 1 Gardner, NW NW, Sec. 22-15s-16w .....Changing to cable tools 1,635 ft.

WASHINGTON COUNTY

South Alabama O. & G. Co.'s No. 1 Wilson, Sec. 26-7n-1w. Rigging up.

WILDCAT OPERATIONS IN SOUTHWEST TEXAS

(Continued from Page 87)

Jones & Voits' No. 1 Bonkowsky, 150 ft. to N and W lines of William McMenenes Sur., 13 miles E of San Antonio .....T.D. 907 ft.; standing.
Dr. Ewell Neil's No. 1 J. Watson, 500 ft. from W line, 1,700 ft. from S line of B. Martinez Sur. .....T.D. 2,495 ft.; in Edwards, dry.
Schneider, Rees et al's No. 2 Claussen, 12 miles NE of San Antonio .....T.D. 1,330 ft.; S.D.

BROOKS COUNTY

Allen & Morris' No. 1-A Holbien-Wormser, skidded rig a few feet from No. 1 .....Drlg. 600 ft.
Ed East's No. 1 A. Garcia, 600 ft. from N and E lines of 3,168-ac. tract in SW part of county .....T.D. 854 ft.; drlg.
F. G. Stearns' No. 1 Mrs. B. Myrick, 610 ft. W, 150 ft. S of NE cor. of Lot 2, Blk. 2, Falfurrias Farm and Garden tracts 2 miles N of Falfurrias .....T.D. 1,027 ft.; drill pipe stuck.
Otto Wood's No. 1 Matilda Martinez, 2,330 ft. from E line, 3,070 ft. from N line of Longoria League .....Location.

CALDWELL COUNTY

George Sullivan and Shell Petroleum Corp.'s No. 1 Flinsoil, 2,800 ft. to SW line, 300 ft. to NW line of tract and survey in M. Dennis Sur. .....T.D. 180 ft.; set surface csg.
Kistler, Stivers & Hendrick's No. 1 D. Carter, 400 ft. from NW line of Sur., 300 ft. NE of Creek in I. Allen Sur. .....T.D. 1,485 ft.; standing in chalk.
Taylor Oil Co.'s No. 1 McBride, 12 miles NE Luling .....T.D. 1,400 ft.; abnd.

COLORADO COUNTY

Coyle-Concord Oil Co.'s No. 1 Stewart Nelson in I.&G.N. Sur. No. 43 .....T.D. 670 ft.; resumed drlg.

DE WITT COUNTY

Pat Armstrong's No. 1 E. T. Clark, 2,000 ft. S of Simms-Republic's No. 1 Clark in Jose Santos Sur.....Dropped till work starts.
J. F. Richardson's No. 1 Virginia Taylor, 330 ft. from SE line of tract, 330 ft. NE of Minnehuilla Creek....Location.
The Texas Co.'s No. 1 John McCrabb, 4,000 ft from SW line, 1,435 ft. from SE line of 794-ac. lease in James Quinn Sur. .....T.D. 3,225 ft.; drlg.

DUVAL COUNTY

Aztec Oil & Royalty Co.'s No. 1 Peters, 750 ft. from E line, 300 ft. from N line of S 160 ac. of Sur. 322 .....Spudded in.
French Oil Corp.'s No. 1 G. W. Dutherland in Sur. 506....Location.
Hynes and Nessly's No. 1 Duval Ranch Co., 200 ft. from S and E lines of Blk. 26, Sur. No. 196 .....T.D. 3,000 ft.; abnd.
O. W. Killam's No. 1 Peters, 150 ft. from E line, 450 ft. from N line of SE of Sur. No. 1 .....T.D. 2,725 ft.; standing.
Plymouth Oil Co.'s No. 1 Parr, 6,250 ft. from W line, 1,925 ft. from S line of San Andres, Garcia grant ...Rigging up.
Suttle et al's No. 1 Bennett, 150 ft. from N and E lines of Sur. No. 44 .....T.D. 2,329 ft.; comp. 3,000 bbls.
The Texas Co.'s No. 1 Peters, 2,330 ft. from N and W lines of Sur. 162 .....Location.
The Texas Company's No. 1 Peters, 150 ft. from N and W lines of Sur. 162 .....Location.
E. R. Thomas' No. 1 Wood-Welder, 300 ft. from S and E lines of Sur. 383 .....Location.

GUADALUPE COUNTY

J. E. Clark's No. 1 Hardin Clay, 450 ft. from SE line, 150 ft. from NE line of tract in F. Carajal Sur. .....Derrick and rig on ground.
J. E. Clark's No. 1 R. Drummer, 600 ft. from SE line, 150 ft. from SW line of tract in Francisco Caravajal Sur. No. 47 .....Abnd. location.
Sal-Mar Oil Co.'s No. 1 Zunker, 450 ft. from W line, 170 ft. from S line of lease in L. Bollinger Sur. ....T.D. 1,900 ft.; drlg.
Taylor Oil Co.'s No. 1 Pearson, S of Kingsbury.....Abnd.

GOLIAD COUNTY

John F. Camp and Stanolind Oil & Gas Co.'s No. 4 Pettus, 1,000 ft. S and 55.5 deg. W of No. 1 Pettus ....Set surface csg.
Gulf Prod. Co.'s No. 1 J. O'Connor, 5,900 ft. from N line, 7,400 ft. from W line of D. Morris Sur. .....T.D. 1,500 ft.; drlg.
Hoffman & Gooch's No. 1 Fromme, 600 ft. from N and 1,200 ft. from W line of Peter B. Dexter Sur. .....T.D. 2,470 ft.; standing.
Humble Oil & Ref. Co.'s No. 1 Fromme, 450 ft. from S line, 150 ft. from W line of lease on Geo. Kersey Sur..T.D. 2,973 ft.; drlg.
Plymouth Oil Co.'s No. 2 Parks, 400 ft. S of No. 1 Parks in Solomon Parks Sur. .....T.D. 5,137 ft.; waiting csg.
Neal et al's No. 1 J. M. Petitus, 10,700 ft. to S line, 3,800 ft. to E line of Pedro Trevino Sur. .....T.D. 4,565 ft.; standing.

GONZALES COUNTY

Crowder Oil Co.'s No. 1 Preston, 1,000 ft. from W line, 2,000 ft. from N line of W. W. Pace Sur. .....T.D. 200 ft.; standing.
Edmiston & Kirby Petroleum Co.'s No. 1 J. W. Ward, Jr., 300 ft. from N and W lines of tract in Dan McKay Sur. .....T.D. 1,529 ft.; S.D
Johnson & Mattock's No. 1 J. James, 12 miles NE of Gonzales city, 900 varas from E line, 300 ft. from S line of tract in M. A. Williams Sur. .....T.D. 2,300 ft.; reaming.

HIDALGO COUNTY

Barrett-Kanellos' No. 1 J. B. Brock, 7 miles W and N from Mission (on Monte Cristo road) .....T.D. 4,475 ft.; coring.
San Roman Oil Co.'s No. 1 J. T. Lomax, 7,500 ft. from S and E lines of San Roman Sur. .....T.D. 500 ft.; S.D.
Dayle L. Smith's No. 3 Dasham, SW part of county.....T.D. 1,726 ft.; S.D.

JIM HOGG COUNTY

Borah, Allen & Co.'s No. 1 E. Guerra, 150 ft. to S and W lines of Blk. 4, Sur. 86 .....T.D. 1,800 ft.; abnd.
Clark & Cowden's No. 1 E. Vela, Share 1 El Pepote grant. Rigging up.
D. C. DeWitt's No. 1 Gomez, 1,170 ft. from N line, 150 ft. from W line of Sur. No. 13, SW part of county ..T.D. 1,457 ft.; tested salt water.
Duval Oil Co.'s No. 1 W. W. Jones, 1,020 ft. from S and W lines of 160-ac. tract in Holden Subd. of Share 5-A in San Diego Hinajosa grant .....T.D. 3,000 ft.; abnd.
Grayburg Oil Co.'s No. 1 J. Weil, Sur. 83 .....T.D. 1,410 ft.; drlg.

JIM WELLS COUNTY

Carroll Brown's No. 1 Seefeld, 900 ft. from W line, 600 ft. from S line of Seefeld farm, Lot 4-2, Pointevant Sur. No. 295 .....Location.
F. A. Lain's No. 1 Vernon Porter, 800 ft. from S line, 400 ft. from W line of 200-ac. tract in Sur. 25 .....Rebuilding derrick.
S. J. Sloane's No. 1 W. Wade, 150 ft. SW of cen. of NE line of Lot 6, Blk. C of Wade ranch, C. Blanca Sur...T.D. 2,360 ft.; drlg.
M. E. Trussell et al's No. 1 W. T. Wright, 250 ft. from W line, 150 ft. from N line of NW 200 ac. of W. T. Wright, 3,000-ac. El Carro pasture .....Location.

KARNES COUNTY

A. E. Edmiston's No. 1 O. L. Cochran, 150 ft. from S line, 500 ft. from E line of farm in D. B. McConnell Sur. .....T.D. 1,820 ft.; standing.
Nichols Oil Co.'s No. 1 Newberry, 210 ft. S, 60 de. E from Fort Bend Oil Co.'s No. 1 Newberry .....T.D. 3,300 ft.; S.D.
Pickett et al's No. 1 D. E. Lyons in Victor Blanco Sur....Drlg. 2,100 ft.

KERR COUNTY

Eastland Oil Co.'s No. 1 Love, 600 ft. E of No. 1 Love in J. Martinez Sur. No. 1,594 ..... Spudded in.
Evans & Gant's No. 1 E. Young, A. E. Burg Sur. 28....T.D. 1,312 ft.; standing.
Verde O. & G. Co.'s No. 1 J. D. Witt, 1,320 ft. from N line, 1,220 ft. from W line of Sec. 1,923, Hamilton Sur., 4 miles from Center Point; T.D. 200 ft; carried to this depth and abandoned as Herber Oil Co.'s No. 1 J. D. Witt .....T.D. 110 ft.; standing.

KLEBERG COUNTY

H. Carter et al's No. 1 R. H. Simmons, in Sec. 7, King Sur. No. 3 .....T.D. 3,205 ft.; standing; derrick blew down.

LA SALLE COUNTY

Frank Clark's No. 1 Coleman, 200 ft. from S and E lines of Blk. 15, Sur. No. 514 .....T.D. 40 ft.; set surface pipe.

LIVE OAK COUNTY

Catlett & O'Neill's No. 1 H. D. Miller, 2,400 ft. from SW line, 6,125 ft. from NW line of Miller ranch in SE part of county .....T.D. 2,500 ft.; drlg.
J. A. Harper's No. 1 fee, 2,130 ft. to N line, 510 ft. to E line of farm, J. Pointevant Sur. 27 .....Spudded in and standing.

LEE COUNTY

Paton Bros.' No. 1 C. A. Turner, 150 ft. from N line, 375 ft. from E line of tract in David Hudson Sur., 2 miles SE of Tanglewood .....Location for Edwards lime test.
Washington-Lee Oil Co.'s No. 1 Hicket, 1,100 ft. from N line, 200 ft. from E line of tract in J. D. Varreiman Sur. .....T.D. 1,560 ft.; abnd.

MEDINA COUNTY

Robertson Drilling Co.'s No. 1 Little, 2,350 ft. from N line, 1,500 ft. from E line of E. B. Rutledge Sur., southern part of county .....T.D. 160 ft.; S.D.

MILAM COUNTY

Birdwell et al's No. 1 E. and J. S. Williams, 150 ft. from N and E lines of 46-ac. tr. in Samuel P. Carson Sur., 5 miles SW of Rockdale .....T.D. 1,603 ft.; abnd.
H. W. Elliott's No. 1 Marek, 767 ft. from N line, 500 ft. from W line of 160-ac. tr. in B. Wickson Sur. .....T.D. 3,400 ft.; sulphur water.
Keyser & Roberts' No. 3 Ward, 125 ft. NE of No. 2 Ward, in Levi Taylor Sur. .....Derrick.
Michalk & Clark's No. 1 Johnson, 60 ft. S of No. 1 Johnson on 100-ac. lease in Juan Jose Acosta Sur. ..T.D. 1,750 ft.; drlg.
Keyser & Nichols' No. 1 Irwin, 450 ft. from NW line, 150 ft. from NE line of 126-ac. tract in Levi Taylor Sur. .....T.D. 300 ft.; drlg.

NUECES COUNTY

C. E. McCarthy's No. 1, W of Corpus Christi .....Dropped till operations start.

REAL COUNTY

McGinley Corp.'s No. 1 Haby, C of SW, Sec. 175 .....T.D. 2,530 ft.; fishing.

SAN PATRICIO COUNTY

John F. Camp's No. 1 Jackson, SW cor. SW, Sec. 30, 3 miles from Edroy .....T.D. 5,507 ft.; S.D.; contract depth.

STARR COUNTY

Coastal O. & G. Co.'s No. 1 Kelsey-Bass, 448 ft. to N line, 150 ft. to W line of Tract 52, Sur. 2, Porcion 86..T.D. 705 ft.; drlg.
Davenport et al's No. 1 Wells, 30 miles W of Mission ..T.D. 1,093 ft.; csg. stuck.
Frank LaBorde's No. 1 Juan Marroquin, 1,250 ft. from E line, 1,225 ft. from S line of Share 21 of W two-thirds of Porcion 75 .....T.D. 516 ft.; drlg.
Sinclair & Rutherford's No. 1 J. T. Canales, 150 ft. from S and W lines of Share 69 of W half of Porcion 79, Camargo .....Derrick.
Stryalls Oil Corp.'s No. 1 M. E. Salinas, 155 ft. from N and W lines of lease in Porcion 80, Share 38 ....T.D. 2,115 ft.; drlg.
Strayhorn Oil Co.'s No. 1 Caffarelli, Porcion 10, 150 ft. from N and E lines of Share 19-A .....Spudded in.
Stryalls No. Corp.'s No. 1 Margo, 150 ft. from N and E lines of Share 27 of Subd. of Porciones 80 and 81, Jurisdiction of Camargo .....Rigging up.
R. B. Suttle's No. 1 Guerra, 2,000 ft. to N line, 270 ft. to W line of Porcion 110 .....T.D. 810 ft.; no report.
Jack Tarver's No. 1 Guerra, NE of Rio Grande City ....T.D. 2,591 ft.; plugging back to 2,146 ft.
E. L. Williams' No. 1 L. G. Madrigal, 150 ft. from N and W lines of Share 5-A of Porcion 72 of Jurisdiction of Mier .....T.D. 212 ft.; drlg.
Jess Williams' No. 1 Welch, 1,120 ft. to W line, 1,500 ft. to N line of tr. in Pedernal grant .....T.D. 840 ft.; drlg.

TRAVIS COUNTY

C. R. Franklin et al's No. 1 J. Wilson, 160 ft. from N and W lines of farm in A. Alexander Sur. .....T.D. 1,210 ft.; S.D.
Fritz Fuchs' No. 1 Swedish, 2,350 ft. from NE line, 750 ft. from NW line of Thomas Smith Sur. .....T.D. 900 ft.; S.D.
Ray & Hense's No. 1 Hatech, in C of tr. in S. Hamilton Sur. .....T.D. 900 ft.; abnd.
Ray & Orth's No. 1 Lundgren, 550 ft. from N line, 150 ft. from W line of 133-ac. tr. in L. Kimbro Sur. ....T.D. 550 ft.; drlg.

WEBB COUNTY

Blair & Livingston's No. 1 J. M. Garcia, 150 ft. from N and E lines of NE NW of Sur. 1,100 .....Location.
McGinley Corp.'s No. 1 A. C. Billings, 450 ft. from N line, 150 ft. from W line of SW NE Sur. No. 71 ....T.D. 2,100 ft.; drlg.
Phillips Rosenberg's No. 1 Green, 245 ft. from S line, 450 ft. from E line of Sur. No. 233 .....T.D. 2,700 ft.; drlg.
Phillips Rosenberg's No. 1 Laurel, 291 ft. from E and N lines of Blk. 10, Sur. 271 .....T.D. 3,100 ft.; no report.
Phillips Rosenberg's No. 2 Laurel, 150 ft. from N and W lines of Blk. 8, Sur. 271 .....T.D. 2,130 ft.; no report.
E. R. Thomas' No. 1 Welder-Wood, 200 ft. from S and E lines of Sur. 383 .....Location.
Thompkins et al's No. 1 Ortiz, 200 ft. from E line, 2,000 ft. from N line of Sur. No. 1,808 .....T.D. 750 ft.; drlg.

WILLIAMSON COUNTY

McLean et al's No. 2 R. C. Miller, 800 ft. to S line, 100 ft. to W line of tr. in B. Manlove Sur. .....T.D. 400 ft.; S.D.
McNeill & Matthews' No. 1 Bachmayer, 300 ft. from E line, 150 ft. from S line of C. C. Browning Sur. ...T.D. 1,700 ft.; drlg.
G. B. Peterman's No. 1 Guentzel, 300 ft. from SE line, 367 ft. from SW line of tract in H. Cooks Sur. .....T.D. 2,132 ft.; drlg.
G. L. Rowsey's No. 1 Streit, 450 ft. from SW line, 150 ft. from NW line of tract in J. West Sur. .....T.D. 1,870 ft.; abnd.

WILSON COUNTY

A. M. Blume's No. 1-A Nicholson, 105 ft. N, 27 deg. E of No. 1 Johnson .....Location.
Sun Oil Co.'s No. 1 Tudyk, 650 ft. from W line, 500 ft. from S line of 157-ac. tract in John Turner Sur. ....Rigging up.

ZAPATA COUNTY

Joe Cullinan's No. 1 E. Gutierrez, 1,992 ft. from NE line, 2,302 ft. from SE line of Charco de la India grant .....T.D. 610 ft.; drlg.

Ballard & Mercer's No. 1 Flores, 500 ft. from NE line, 580 ft. from SE line of Blk. 27, Porcion 87 ..... T.D. 2,497 ft.; recementing csg.
Donohoo et al's No. 1-A Garcia, 150 ft. from NE and SE lines of Blk. 7 of Subd. of 700 ac. of Share A, Charco Redondo grant ..... Rigging up.
Hunt & Polk's No. 1 H. Ramirez, 7,675 ft. N of S cor. and 2,918 ft. from W line of Share A of Villa grant.. T.D. 672 ft.; drlg.
McGinley Corp.'s No. 1 G. G. Flores, 750 ft. SW of E cor. and 150 ft. from SE line of Sur. 242 but in Sur. No. 259 ..... T.D. 1,753 ft.; abnd.
T. J. Murray's No. 1 Haynes, 2,915 ft. from NE line, 5,619 ft. from NW line of Comitas grant ..... T.D. 100 ft.; drlg.

SOUTHWEST TEXAS PROVEN AREAS

Week Ending June 4

YOST FIELD—BASTROP COUNTY

Campbell & Tong's No. 8 Yost, 300 ft. SE of No. 7 Yost, A. Garcia Sur. ..... T.D. 960 ft.; drlg.

COSDEN POOL—BEE COUNTY

Henderson Coquat's No. 1 Leroy Roberts, 300 ft. from W line of lease, 300 ft. N of NE cor. of Grem-mel tract ..... Drlg. 4,058 ft.

NORMANNA POOL—BEE COUNTY

The Texas Co.'s No. 1 Scott, E of Normanna Field, 500 ft. N and W lines of lease in Jose Maria Uranga grant ..... T.D. 4,025 ft.; drlg.

PETTUS POOL—BEE COUNTY

Slick-Seeligson's No. 6 Ray, 400 ft. N of No. 3 Ray and 150 ft. from W line of lease and survey. ..... T.D. 3,650 ft.; drlg.
The Texas Co.'s No. 5 Gremmell, 450 ft. N of No. 1 Gremmel in (south) John Pace Sur. ..... Spudded in and set surface csg.
United Prod. Co.'s No. 42 Ray, near No. 31 Ray ..... T.D. 3,939 ft.; comp. 130 bbls.
United Prod. Co.'s No. 43 Ray, NE of field ..... T.D. 3,942 ft.; comp. 125 bbls.

COOKSEY POOL—BEXAR COUNTY

Chiquita Oil Co.'s No. 3 Pollock, 330 ft. from S line and N offset to Chiquitas No. 1 Hunter in J. W. Rialls Sur. ..... T.D. 1,530 ft.; comp. 5 bbls.
Chiquita Oil Co.'s No. 4 Pollok, 660 ft. W of No. 3 Pollok in J. Rialls Sur. ..... T.D. 1,522 ft.; bailing.

ECKERT POOL—BEXAR COUNTY

Alamo Nat. Gas Co.'s No. 3 J. H. Gembler, 180 ft. from N and E lines of tr. in A. Manachaca Sur. 51.. T.D. 1,216 ft.; drlg.
E. M. Carl's No. 1 F. Gembler, 160 ft. from N line, 750 ft. from E line of tract in J. Montes Sur. ..... T.D. 482 ft.; changing to rotary.
F. H. Eckert & Son's No. 1 Louis Brehm, W offset to No. 3 John J. Brehm ..... Location.

GAS RIDGE—BEXAR COUNTY

American Gas Co.'s No. 5 W. H. Kennon, 1,750 ft. from S line, 2,000 ft. from E line of 400-acre tract in Maria F. Rodriges Sur. ..... T.D. 2,205 ft.; drlg.

DUNLAP POOL—CALDWELL COUNTY

Bob Rose's No. 1 Walker, 320 ft. from NW line 150 ft. from NE line of Walker lease, Solomon Seal Sur.. Location.
Cole et al's No. 1 Pierce, 400 ft. from NE line, 445 ft. from NW line of Pierce 100-ac. tract in Solomon Seal Sur. ..... Derrick on ground.
Empire Gas & Fuel Co.'s No. 1 Walker, direct S offset to Bob Rose's No. 1 Pierce in Solomon Seal Sur. ..... Coring 2,087 ft.

WEBSTER POOL—CALDWELL COUNTY

C. J. Webster Oil & Gas Co.'s No. 1 McCrory, 600 ft. W of SW cor. of Abe Lucas tract in John Neill Sur.... Reinstated; whipstkg. above Buda.
C. J. Webster Oil & Gas Co.'s No. 1 C. F. Robertson, 700 ft. from E line, 200 ft. from N line of 100-ac. tract, John A. Neill Sur. ..... Building derrick.

COLE POOL—DUVAL COUNTY

Cole Pet. Co.'s No. 75 Benavides, 365 ft. from NE line, 150 ft. from NW line, Blk. 8, Sec. 18, Mariana Arispe grant ..... T.D. 5,986 ft.; coring
Co-operative Drilling Co.'s No. 5 John Dinn, 264 ft. from N line, 150 ft. from W line of Blk. 5, Sur. 454.. T.D. 1,645 ft.; abnd

GOVERNMENT WELLS—DUVAL COUNTY

H. H. Coffield's No. 1 H. Wendt, 150 ft. from S and E lines of NE of Sur. No. 43 ..... Spudded in.
Duval Oil Corp.'s No. 9 Bishop Cattle Co., 2,216 ft. to W line, 2,221 ft. to N line of Sur. No. 135 ..... T.D. 2,397 ft.; comp 100 bbls.
Duval Oil Corp.'s No. 10 Bishop Cattle Co., 1,336 ft. from N line, 1,620 ft. from W line of Sur. No. 135 ... T.D. 2,365 ft.; drilling plugs.
Humble Oil & Refining Co.'s No. 4 White, 2,310 ft. from S line, 1,320 ft. from W line of Sur. 58 ..... Location.
Humble Oil & Ref. Co.'s No. 5 Paul White, 1,980 ft. from W line, 990 ft. from S line of Sur. 58 ..... Derrick.
Magnolia Pet. Co.'s No. 1 G. Wendt, 150 ft. from S and E lines of NW Sur. 44 ..... Location.
Magnolia Pet. Co.'s No. 1 J. T. Johnson, 150 ft. from N and W lines of SW NE Sur. 44 ..... Location.
Magnolia Petroleum Co.'s No. 1 J. T. Johnson, 150 ft. from N and W lines of SW of NE of Sur. 44..... Location.
Magnolia Petroleum Co.'s No. 1 Gilbert Wendt, 150 ft. from S and E lines of NW of Sur. 44 ..... Location.
Southwest Drilling Co.'s No. 1 R. Wendt, 150 ft. from S and E lines of Sur. No. 43 ..... T.D. 100 ft.; S.D. for water.

SARNOSA FIELD—DUVAL COUNTY

John F. Camp's No. 2 Well, 1,200 ft. N, 18 deg. W of No. 1 Well in Sur. No. 570 ..... Building derrick.
Magnolia Pet. Co.'s No. 1 M. Ruiz, 200 ft. from NW and SW lines of SE half of Sur. 574 ..... Spudded in.
The Texas Co.'s No. 1 Ruiz, 150 ft. from NE and NW lines of Sur. No. 127 ..... T.D. 2,590 ft.; drlg.
Sun Oil Co.'s No. 1 Cano, 200 ft. from NW and NE lines of SE half of Sur No. 576 ..... T.D. 2,252 ft.; topped sand.

SLICK POOL—GOLIAD COUNTY

T. B. Slick estate's No. 2 Allen, 1,660 ft. from NE line, 330 ft. from NW line of tr. in Obid Marshall Sur. . T.D. 4,211 ft.; pulling liner to deepen.

DARST CREEK—GUADALUPE COUNTY

Humble Oil & Ref. Co.'s No. 4 Dan Denman, 600 ft. W of SW cor. of John F. Camp's 50-ac. lease, 150 ft. S of road, Wm. Arrington Sur. ..... T.D. 2,355 ft.; comp. 1,000 bbls.
Humble Oil & Ref. Co.'s No. 5-C Sue Denman, 525 ft. from E line, 600 ft. N of No. 4-C, Wm. Arrington Sur. ..... T.D. 2,000 ft.; drlg.
Sun Oil Co.'s No. 2 Dowdy, 500 ft. from N line of tract 700 ft. from W line of tract and survey in Jacob C Darst Sur. ..... T.D. 500 ft.; drlg.

JACOB POOL McMULLEN COUNTY

Jacob, Buzzini & Pickett's No. 3-A Jacob, 740 ft. N, 75 deg. W of No. 2-A Jacob ..... T.D. 960 ft.; bailing.
Jacob, Buzzini & Pickett's No. 1-B Jacob, Sec. 15 G.H.&H. Ry. Sur. ..... Spudded in.
Jacob, Buzzini & Pickett's No. 1-C Jacob, Sec. 47, J. Pointevant Sur. ..... Location.
Longhorn Oil Co. and American Gas Co.'s No. 1 Lark, 2,790 ft. from N line, 1,150 ft. from W line of Lark tract, E. W. B. Scrugham Sur. ..... Moving in.

ADAMS FIELD—MEDINA COUNTY

Yantis Oil Co.'s No. 1 Adams, 420 ft. from S line, 2,000 ft. from W line of F. Mumme Sur. ..... Location.

KING FIELD—NUECES COUNTY

John F. Camp and Stanolind Oil & Gas Co.'s No. 2 King, 660 ft. from S and E lines of Sec. 23 of King Subd.. T.D. 1,775 ft.; drlg.

SAXET FIELD—NUECES COUNTY

Gulf Coast Oil Co.'s No. 1 Perkins and LeGasse, 330 ft. from N and E lines of 245-ac. tr., Sec. 26, Shepard Subd. ..... T.D. 4,566 ft.; wild gasser.
Gulf Coast Oil Co.'s No. 1 Bessie Elder, offset to No. 1 Perkins & Gasse, a wild gasser ..... T.D. 1,500 ft.; drlg.
V. B. Hillegeist's No. 1 McGregor, 150 ft. from W line, 330 ft. from S line of Sec. 311 ..... T.D. 4,400 ft.; drlg.
Rutherford Drlg. Co.'s No. 1 Hunter, 150 ft. from S and W lines of 10-ac. tr. ..... T.D. 4,807 ft.; tested salt water.
Saxet Oil Co.'s No. 5 Well, 3,041 ft. to N line, 333 ft. to W line ..... T.D. 2,500 ft.; standing.
Tule Lake Oil Co.'s No. 1 Hocker & Sevier, 200 ft. from E line, 150 ft. from S line of tract ..... T.D. 4,074 ft.; initial flowing at rate of 500 bbls.

ARANSAS POOL—SAN PATRICIO COUNTY

Atlantic Oil Prod. Co.'s No. 4 Welder, 1,900 ft. S, 30 deg. E of No. 3 Welder ..... Digging slush pit.

WHITE POINT—SAN PATRICIO COUNTY

United Prod. Co.'s No. 3 Cage ..... T.D. 4,925 ft.; no report

LOS OLMOS POOL—STARR COUNTY

Allison & Roberts' No. 1 Kelsey Bass in Sec. 6, Subd. of Porciones 75, 76, 77 ..... Location.
Coastal Oil & Gas Co.'s No. 1 Kelsey-Bass, 697 ft. from W line, 878 ft. from N line of NW NW Sec. 5, Subd. of Porciones 75, 76 and 77 ..... T.D. 250 ft.; drlg.
Bennett O. & G. Co.'s No. 1 Seabury et al, Porcion 75,... Moving in.
H. H. Davis' No. 6 Kelsey Bass, 20 ft. from E line, 600 ft. from N line of SW NW Section 6, Subd. of Por-cions 75, 76, 77 ..... Spudded in.
Day & Co.'s No. 1 Kelsey Bass, 150 ft. from S line, 400 ft. from W line of W 20 acres of NE NW of Sec. 6, Subd. of Porcions 75, 76, 77 ..... T.D. 487 ft.; set csg.
Felder, Mitchell & Barnsley's No. 1 Kelsey-Bass, in Sur. 8, Subd. of Porcions 75, 76 and 77 ..... T.D. 320 ft.; moving in larger rig.
Griffin et al's No. 1 Bass, 150 ft. from N and W lines of NW NW Sur. 11, Subd. Porcions 75, 76, 77 ..... T.D. 1,200 ft.; no report.
Hooks & Weaver's No. 6 Kelsey Bass, 150 ft. from N and E lines of NE SW Sec. 6, Subd. of Porcions 75, 76, 77 ..... T.D. 468 ft.; set csg.
M. A. Landrum's No. 3 Kelsey-Bass, 519 ft. from S line, 150 ft. from E line of Sur. 6, Porcions 75, 76 and 77 ..... Location.
M. A. Landrum's No. 1 A. K. Bass, Sec. 6, 150 ft. to S and E lines of lease ..... Location.
Los Olmos Oil & Gas Co.'s No. 13 Kelsey Bass, 500 ft. from W line, 150 ft. from S line of NW NW Sur. 7, Porciones 75, 76, 77 ..... Location.
Tom C. Patton's No. 1 Kelsey-Bass, 150 ft. to W line, 150 ft. to S line of 20-ac. tract in NW NE of Subd. 8 of Porcions 75, 76 and 77 ..... T.D. 1,050 ft.; standing.
R. H. Pursley's No. 2 Seabury et al, 650 ft. from S line, 150 ft. from E line of Pursley 80-acre lease in Share 5 of Partition of Porcion 75 ..... T.D. 556 ft.; set csg.
Quien Sabe Oil Co.'s No. 1 Kelsey Bass, 300 ft. from N line, 750 ft. from W line of NE SW Section 8, Porciones 75, 76, 77 ..... Location.
Rio O. & G. Co.'s No. 3 Kelsey-Bass, No. 6 Subd., Por-cions 75, 76 and 77 ..... T.D. 569 ft.; standing.
Sinclair & Rutherford's No. 1 Kelsey Bass, 150 ft. from S and W lines of SE NW Sec. 6, Subd. of Porcions 75, 76, 77 ..... T.D. 350 ft.; drlg.

RIO GRANDE CITY POOL—STARR COUNTY

Brady Drilling Co.'s No. 1 Rio Grande City, in center of city Plaza ..... Dropped; duplication
Coastal Oil & Gas Co.'s No. 1 Olivarez, 150 ft. from NE and SE lines of easternmost corner of Share 35, Porcion 80, Camargo ..... Derrick.
Gulf Coast Oil Co.'s No. 1 Perez, 150 ft. from N and E lines of Share 16-C, Porcion 80, Camargo ..... Rigging up.
R. A. Hoffman's No. 1 Goodrich, 150 ft. from N and W lines of Blk. 6, Tract 5, Porcion No. 81 ..... Spudded in.
R. E. Johnson's No. 1 Seabury, 150 ft. from S and W lines of Share 32, Porcion 80, Jurisdiction of Camargo. T.D. 1,410 ft.; drlg.
Edwin M. Jones' No. 1 Chatfield, 200 ft. from N and E lines of N half of Blk. 3, Tract 21, Porcion 80, Camargo ..... T.D. 1,940 ft.; drlg.
King Pin Oil Co.'s No. 1 T. C. Lewis, 207 ft. from E line, 111 ft. from S line of Share 22, Porcion 80, Jurisdiction of Camargo ..... Derrick.
R. H. Pursley's No. 1 San Juan Plaza, cen. of Blk. 96, Rio Grande City ..... Location.
Sioux Oil Co.'s No. 3 Goodrich, 150 ft. from W line, 200 ft. from S line of Blk. 1, Tract 5, Porcion 80, Camargo. T.D. 1,500 ft.; standing.

WEST COLE POOL—WEBB COUNTY

French Oil Corp.'s No. 1 Benavides, 1,980 ft. from S line, 1,470 ft. from E line of Sur. 662 ..... T.D. 1,150 ft.; drlg.
French Oil Corp.'s No. 4-A Benavides, 2,640 ft. from N line, 150 ft. from W line of Sur. 659 ..... T.D. 2,334 ft.; comp. 75 bbls
Magnolia Petroleum Co.'s No. 2-F Benavides, 200 ft. from N line, 150 ft. from E line of S half of Sur. 660 ..... T.D. 2,340 ft.; comp. 50 bbls.

CHAPMAN POOL—WILLIAMSON COUNTY

Westbrook Oil Co.'s No. 8-B Lawrence, 340 ft. NE of No. 7-B, and 150 ft. from SE line of 27-ac. tr. in S. Miller Sur. ..... T.D. 1,170 ft.; drlg.
R. A. Westbrook's No. 9 Simmons, 550 ft. along SE line of J. J. Sides' 10-ac. tr. from SW cor., thence 260 ft. SW at right angles and between Nos. 7 and 8 ..... T.D. 1,100 ft.; drlg.
Westbrook Oil Co.'s No. 9-B Lawrence, 340 ft. NE of No. 8-B an 150 ft. from SE line of 27-ac. tr. in S. Miller Sur. ..... Location.

ESCOBAS POOL—ZAPATA COUNTY

Allied Oil & Gas Co.'s No. 24 Gutierrez, 750 ft. from SE line, 1,478 ft. from NE line of Share 4, Comitas grant. T.D. 1,478 ft.; comp. 100 bbls.
Allied Gas Co.'s No. 25 Gutierrez, 150 ft. from NE line, 1,225 ft. from SE line of Share 4, Comitas grant .... T.D. 1,473 ft.; set csg.
E. K. Bateman's No. 1 M. Garza Estate, 150 ft. to NE and SE lines of Douglas Subd. of Comitas grant ..... Abnd. location.
E. R. Black & Paul S. Williams' No. 1 Comitas grant, 150 ft. from NW and NE lines of Blk. 100 ..... Abnd. location.
F. M. Blair & Son's No. 1 Montemayor, 450 ft. to N, 150 ft. to E line of Blk. No. 1, Sur. 63 ..... T.D. 1,462 ft.; tested salt water.
H. H. Coffield's No. 2 Santiago Bustamente, 150 ft. from SE and NE lines of Coffield 80-ac. lease, Share 34, Comitas grant ..... Rigging up.
H. H. Coffield's No. 3 Santiago Bustamente, 450 ft. from SE line, 150 ft. from NE line of Coffield 80-ac., Share 34, Comitas grant ..... Location.
McGinley Corp.'s No. 2 G. T. Montemayor, 150 ft. from S and E lines of Blk. 2, Sur. 64 ..... T.D. 1,748 ft.; abnd.
McGinley Corp.'s No. 1 Jose Bustamente, 1,200 ft. to NE line, 150 ft. to NW line of 105.7-acre Henne, Winch & Fariss tract, Share 35, Comitas grant ..... T.D. 1,820 ft.; standing.
McGinley Oil Corp., No. 1 G. T. Montemayor, 150 ft. from N and W lines of Blk. 6, Sur. 64 ..... Location.
O. W. Killam's No. 8 Medina, 1,130 ft. from NE line, 325 ft. from SE line of Share 34, Comitas grant .... T.D. 1,447 ft.; testing.
S.R.C. Oil Co.'s No. 10-D Montemayor, 150 ft. from SW line, 987 ft. from N line of Blk. 9, Sur. 64 ..... T.D. 1,477 ft.; comp. 276 bbls.
S.R.C. Oil Co.'s No. 11-D Montemayor, Blk. 9, Sur. 64... T.D. 1,475 ft.; set csg.
The Texas Co.'s No. 8 Measles, 16,757 ft. from W line, 150 ft. from SE line of Cerrito Blanco grant ..... T.D. 1,400 ft.; drlg.

CHARCO REDONDO POOL—ZAPATA COUNTY

Bob & Richey's No. 29 Martinez, 810 ft. from SW line, 360 ft. from SE line of Blk. 24, W. R. Duke Subd., Charco Redondo grant ..... Location.
Winsor Oil Co.'s No. 1 Martinez, in NE of Blk. 15, of W. R. Duke Subd., Charco Redondo grant ..... Location.

MIRANDO VALLEY—ZAPATA COUNTY

O. W. Killam's No. 1 Hinnant, 1,110 ft. from S line, 310 ft. from E line of Blk. 45, Sur. 613 ..... Location.
O. W. Killam's No. 1 Hinnant, 1,110 ft. from S line, 150 ft. from E line of Blk. 45, Sur. 613 ..... Location.
O. W. Killam's No. 5 fee, Sur. 182 ..... T.D. 1,502 ft.; abnd.

THE ANSWER TO THE OIL INDUSTRY'S PROBLEMS------

Above: Interior view of electrified Magnolia pipe line pump station near Iatan.

Right: Exterior, same installation. Note transformers in right background.

ELECTRIC POWER

No matter what oil field job is being considered, speed, dependability and economy are three big problems confronting the operator. Drilling, pumping, transportation and refining all bring up the point of how well can it be done and for how little. Dependability is vital—continuous operation is essential—but economy is all-important.

Electric power is the answer to all these problems—and there is an electrical expert as near as your phone. Call him for his ideas of how your work should be done—he has a world of knowledge about the latest development in oilfield power application. You'll not be obligated in any way.

TEXAS ELECTRIC SERVICE COMPANY

General Office: Fort Worth

District Offices: Fort Worth Wichita Falls Sweetwater Eastland
Midland Seymour Big Spring Eagle Pass

Technical Questions Answered

BY CHARLES K. FRANCIS, PH.D., TECHNICAL EDITOR

This department of The Oil and Gas Journal is devoted to the manufacturing branches of the oil industry.

Those connected with the refining of crude petroleum, the manufacture of natural gasoline and closely allied industries are invited to submit their problems to Dr. C. K. Francis, technical editor. The department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in the various phases of plant operation; also those connected with the marketing and utilization of petroleum products.

Questions should be submitted in as much detail as possible so as to assure a satisfactory answer.

All inquiries should be signed and if other than the given initials are to be used please indicate the desired letters.

Questions involving patented processes, intricate formulas, and calculations and estimates of costs, for obvious reasons, cannot be answered. The replies will appear on this page within a reasonable time.

PENNSYLVANIA GRADE LUBRICATING OIL

The material below, from the secretary of the Pennsylvania Grade Crude Oil Association, is self-explanatory.—Editor.

"In answering 'A.C.G.' on your page in the March 17 issue of The Oil and Gas Journal you have made statements which this association believes to be incorrect and misleading for reasons which will be presented in the following. Again, in answering "H.H.S." in your issue of April 14, information is given which we think also is erroneous.

"In answering the first question, 'What class of crude oils is considered to be the best adapted for making the better lubricating oils?' you refer to a 'recently completed survey made by the New York University Business Research Bureau' which purports to show that the origin of the crude oil has little to do with the quality of the lubricating oils that may be made from it and that the essential and major factor is the process used and the care observed by the refiner. The survey to which you refer was published in 1930 and, in the opinion of this association, was completely discredited by facts disclosed in an article appearing in the September 4, 1930, issue of 'Editor and Publisher,' copy of which is attached for ready reference.

"With further regard to this question, we would like to call your attention to a recent article by Dr. Gustav Egloff, well-known authority on petroleum. Doctor Egloff says: 'The assertion that properly refined lubricating oils may perform the basic function of a good lubricant regardless of the crude or crudes from which they are derived is not valid and the assumption is absolutely not true. That lubricating oils differ widely as a function of the crude from which they are derived is primarily due to the nature of the hydrocarbons present in the crude oils. It is not merely a question of whether the oil is refined because refining does not change the nature of the hydrocarbons present in the oil but merely eliminates deleterious substances.'

"In answering this part of the other question, 'Explain what is meant by Pennsylvania Base Crude,' you make the statement that 'a paraffin base oil produced in the Mid-Continent district may be classified as Pennsylvania Grade oil.'

"We must take issue with the foregoing and we insist that there is no crude oil produced in the Mid-Continent Field that can be classified as Pennsylvania. Pennsylvania Grade Crude is, of course, a paraffin-base oil, but that, by no means, proves that all paraffin-base oils are Pennsylvania. There is a tremendous difference between the Mid-Continent paraffin-base crude oils and those produced in the Pennsylvania fields.

"In line with this view of the question, we find that the Federal Trade Commission is on record in connection with a case it was called to adjudicate in the following language:

" 'Pennsylvania oil, which is a kind and grade of oil produced in the Appalachian Field, is a high-grade lubricating oil, and is regarded by the public as a superior grade of oil, by reason of which it commands a higher price than other oils produced in the Mid-Continent Field and the California Field, and is also regarded as a higher grade and a more desirable oil than any blend or combination of Pennsylvania oil with the oils produced in said other fields, and commands a higher price in the market than such blend with inferior oils.'

"In view of our contention, we hope you will give this letter space in an early issue of your valued publication."

I admit that if the essential foundation is lacking in a crude oil, the application of ordinary refining treatment will not make a good lubricating oil. The loose use of the term Pennsylvania grade as applied to a paraffin-base oil of foreign origin is not approved.

ISOPROPYL ALCOHOL

What is isopropyl alcohol, how is it made and what use is made of it?—C. H. L.

Isopropyl alcohol is a liquid having the composition indicated by the chemical formula CH_3. CHOH. CH_3, specific gravity 0.7887 and boiling point 180° F. It is made from petroleum and hydrocarbon gases. The process involves absorbing olefine gases, containing propylene, in sulphuric acid and then introducing water into the resulting compound. The crude alcohol is separated by distillation, purified by chemical treatment and distillation.

The properties and uses of this alcohol are fully described in Petrohol, published by Stanco Distributors, 2 Park Avenue, New York. The brief references here mentioned are from this publication. The commercial product is about 91 per cent pure, a colorless liquid having a somewhat bitter taste, an alcoholic odor, mixing with water in all proportions.

It cannot be taken internally without serious muscular inco-ordination and gastric disturbances; the peculiar bitter taste serves as a warning to prevent such use. It is not intoxicating and does not produce any of the exhilerating effect similar to that of ethyl alcohol.

This alcohol is suitable for a wide variety of uses. It will serve in place of ethyl alcohol for many laboratory purposes, such as the drying of preparations, cleaning and purifying agent. It is adapted to use as a denaturant for denatured alcohol used in perfumes and barbers' supplies. Since isopropyl alcohol boils at approximately the same temperature as ethyl alcohol it cannot be separated from it by distillation. It has a superior bactericidal power and an important application is its use as an antiseptic, disenfectant and preservative.

Compared with ethyl alcohol of the same concentration, isopropyl alcohol is generally a slightly superior solvent for organic substances such as essential oils, waxes, resins, hydrocarbons, esters, etc. In a study of a large number of organic solvents as dewaxing agents it has been found that isopropyl alcohol shows a marked selectivity for oil over wax. It is an excellent solvent for pyrethrum, producing an horticultural insecticide extract which when properly diluted with water is harmless to the foilage but producing a very high percentage of insect kills.

Additional uses include: Mouth washes, liniment, cosmetics, toilet preparations, sprays, bay rum, toilet waters, hair tonics, polish removers, hair dyes and perfumery.

DETERMINATION OF HYDROCARBONS IN GASOLINE

Could you give me any information of standard methods or accurate methods for the determination of hydrocarbons in gasolines? I am interested especially in the separation into unsaturated, aromatic, naphthenic and paraffin compounds.—R. J. S.

A method for the determination of hydrocarbons in gasoline has been described by Morrell and Egloff, Industrial and Engineering Chemistry, 18, 354, 1926. The results found by the method were discussed in The Oil and Gas Journal, January 27, 1927, page 156. The description of the method given here is from the first reference.

A 500 c.c. sample is distilled through a Hempel column, packed with glass beads, cutting at 210° F., vapor temperature. The distillate is agitated with twice its volume of 80 per cent sulphuric acid for 15 mintes. After settling the oil layer is separated and measured, calculating the per cent decrease on the basis of the original 210° distillate. The loss represents the percentage of unsaturated hydrocarbons. Sulphuric acid of this strength does not react with the hydrocarbons of the naphthene and paraffin series; also, is without appreciable action on the aromatics.

The acid-treated oil is washed with water, neutralized with a 10 per cent solution of sodium hydroxide, and then redistilled in the same apparatus until the vapor temperature in the Hempel column reaches 210° C. The volume of the residue of the second fractionation to 210° C. is calculated as a percentage of the first 210° C. fraction, and is the percentage of the unsaturated hydrocarbons that have been polymerized during the acid treatment. This, added to the percentage of unsaturated hydrocarbons dissolved by the sulphuric acid, gives the total percentage of unsaturated hydrocarbons in the original 210° C. fraction of the motor fuel.

Into a graduated separatory funnel provided with a stopcock and enlarged stem are put 20 c.c. of the second 210° C. fraction obtained during the analysis of the unsaturated hydrocarbons and 50 c.c. of nitrating mixture — nitric acid 25 per cent, sulphuric acid 58 per cent, and water 17 per cent—added slowly with stirring and cooling. This particular combination of nitrating mixture is important, as it permits nitration of the aromatic hydrocarbons so that the nitration products do not dissolve substantially in the acid sludge but separate as a distinct layer which can be readily determined.

This operation will require from 15 minutes to an hour, as great care must be taken that the temperature of the hydrocarbon mixture does not reach the point where side reactions that might cause explosion may occur. The reaction mixture is allowed to stand until no more gas is evolved. Usually a three-layer system forms—the acid layer at the bottom, an intermediate layer of nitro derivatives, and the oil layer on top. By multiplying the number of cubic centimeters of nitrated compounds by the factor 4.3 the percentage of aromatic hydrocarbons in the second 210° C. fraction is obtained. From this the percentage in the original 210° C. fraction is calculated.

Naphthene hydrocarbons were determined by the aniline method of Tizard and Marshall, which is based on the lowering of the temperature of complete miscibility of aniline and the paraffins by naphthenes.

The oil from the nitration treatment is washed with water and a 10 per cent solution of sodium hydroxide and then thoroughly dried with calcium chloride. The aniline value is determined on this dried oil, which is a mixture of paraffin and naphthene hydrocarbons. Ten cubic centimeters of freshly distilled aniline and an equal volume of the oil are placed in a test tube that is jacketed by a larger test tube. Into the smaller test tube are placed a thermometer (calibrated in 0.1° C.) and a stirring rod. The mixture is heated until the cloud disappears, when the temperature is read. The heating is continued until the solution is just above the cloud point and then allowed to cool until the cloudiness reappears. This cloud point can be read to 0.1° C.

The experiments of Tizard and Marshall and also of subsequent workers indicate that, under the conditions of the test, the paraffin hydrocarbons are completely miscible with aniline at 70° C., and that the cloud point is depressed 0.3° F. for each 1 per cent of naphthene hydrocarbons present. For example, if the cloud point of a paraffin-naphthene mixture is 55° C., which is 15° C. below the temperature of complete solubility of paraffin hydrocarbons in aniline, dividing 15° C. by 0.3° C., we find that the sample contains 50 per cent of naphthene hydrocarbons. This percentage must then be calculated back to the original 210° C. fraction to find the percentage of naphthenes in the original fraction.

The percentage of paraffin hydrocarbons in the original 210° C. is obtained by subtracting the sum of the percentage of unsaturated, aromatic, and naphthene hydrocarbons from 100.

ANALYSIS VAN FIELD, TEXAS, OIL

Would it be possible for you to give me the analysis of the oil from the Van Field, Texas? This oil is about 34 gravity—C. D.

The analysis following is from Report of Investigations 3,130, August, 1931, U. S. Bureau of Mines, Properties of Typical Crude Oils From the East Texas Field:

Sample from J. T. Jarmine well No. 1.
Depth, 2,710 feet.
Sand, Woodbine.
Location, Van Zandt County, Texas.
Gravity, 33.4 A.P.I.
Specific gravity, 0.858.
Sulphur, per cent, 0.89.
Viscosity, S.U. at 100° F., 56 seconds.
Pour point, below 5° F.
Color, brownish black.
Carbon residue, 3.1 per cent.

Products Obtained

Products—	%	Gravity A.P.I.	Viscosity
Gasoline	24.6	61.0°	
Kerosene	16.1	43.6	
Gas oil	8.2	34.2	
Nonvis. lub dist.	11.4	33.4—27.1	50—100
Medm. lub. dist.	7.2	27.1—24.9	100—200
Vis. lub dist.	1.4	24.9—24.3	Above 200
Residuum	30.6	15.1	
Loss	0.5		

The gasoline yield of this oil is somewhat low for the gravity but is well adapted for the manufacture of high grade lubricating oils. It is a paraffin base oil according to the U. S. Bureau of Mines method of analysis and interpretation.

Personal Paragraphs About Oil Men

J. W. Leonard, Jr., has left Elmira, N. Y., and is now in Havana, Cuba.

* * *

W. R. K. Scott, metallurgist of Jones & Laughlin Steel Corporation, Pittsburgh, Pa., was in Tulsa last week.

* * *

R. Ogarrio, vice president of The Texas Company, was a business visitor to Fort Worth, Tex., the past week.

* * *

Homer Freed, independent operator, San Angelo, Tex., left last week on a business trip to Chicago and New York.

* * *

L. B. Stanley, district manager, Durabla Manufacturing Company, Dallas, Tex., was in Tulsa for a few days last week.

* * *

L. T. Blaisdell, district manager of the General Electric Company at Dallas, Tex., was a business visitor in Tulsa recently.

* * *

R. H. Bartlett, president of the Braden Steel & Winch Company, has left to spend the summer at his old home in Cuba, N. Y.

* * *

A. M. Houser, chief production engineer, and Edmund Burke, manager oil sales department, both of Crane Company, Chicago, were in Tulsa last week.

* * *

Fred E. Cooper, Tulsa distributor for Allis-Chalmers and Rumely, is on a trip to the Michigan fields and the home office of the company at Milwaukee, Wis.

* * *

Frank Carr, manager of the Longview, Tex., branch of the Leland Equipment Company, spent a few days at the Tulsa office of the company last week.

* * *

J. P. Byrne, Kansas City, Mo., representative of the Wheeling Corrugating Company, manufacturers of sheet steel and wire products, was in Tulsa during the past week.

* * *

R. E. Cotulla, consulting geologist, is back in San Antonio, Tex. He was formerly stationed there for the Texas Pacific Coal & Oil Company and later in Wichita Falls, Tex.

* * *

C. E. Ross, representing the Service Supply Company, Longview and Fort Worth, Tex., called on oil company buyers in Tulsa whose companies are operating in the East Texas Field.

* * *

L. A. Miller, president and manager of Chief Oil Company, Cheyenne, Wyo., operating a string of bulk and service stations over the State of Wyoming, is a candidate for the Democratic nomination for governor.

* * *

Earl Zeller, formerly advertising manager of the Southern California division of the Associated Oil Company, recently left Los Angeles for Seattle, Wash., to become manager of service stations of the Associated Oil Company throughout the State of Washington.

* * *

Ben E. Lindsley is in charge of the field office and laboratory which the Bureau of Mines has opened at the Shell Petroleum Corporation's headquarters at Kilgore, East Texas. He will be assisted by C. E. Reistle, Jr., Ed Hays and H. C. Miller. G. B. Shea of the Washington, D. C., office is visiting the East Texas field office.

* * *

Roy E. Collom of the Continental Oil Company and chairman of the executive committee of the Kettleman North Dome Association, accompanied by C. P. Watson of the Milham Exploration Company and R. A. Sperry of the General Petroleum Corporation, attended the gas injunction suit at Hanford and, after making a tour of inspection in the Hills, returned to Los Angeles.

R. B. Anderson has left Richelieu, Quebec, and is now at Huntington, W. Va.

* * *

Robert Schermerhorn, of the Schermerhorn Oil Company, has been seriously ill with pneumonia, at Big Spring, Tex.

* * *

Harold C. Neely, of Tulsa, general manager of the Iron Mountain Oil Company, and E. R. Curtin of Lima, Ohio, a director of the company, have been on a trip over Southwest Texas.

Men of the Industry

Clyde M. Bennett

Following his graduation from West Virginia University with the degree of Bachelor of Science in civil engineering in 1909, Clyde M. Bennett entered the employ of the Philadelphia Company, Philadelphia, Pa., in its land and geological department. From 1913 to 1915 he did general oil and gas prospecting in Oklahoma and Arkansas for the Benedum-Trees Oil Company, Pittsburgh. In the latter year he joined the Arkansas Natural Gas Company, Shreveport, La., and did engineering and land department work until December, 1919, when he entered the service of the Louisiana Oil Refining Corporation, Shreveport, as assistant to the president in charge of land and production activities. He assisted in the organization of all operating departments. In 1921 he became vice president and director and he continued in charge of operations until transferred to New York five years later.

In 1926 Mr. Bennett was made president of the Trinidad Oil Field Operating Company and shortly afterward became managing director of that company's subsidiary in the island of Trinidad, British West Indies, engaged in drilling, producing and marketing crude oil. In 1928 he joined the Vacuum Oil Company as general manager of the crude oil department. From this position he went to the Magnolia Petroleum Company as vice president and assistant manager of production, which office he now holds.

Mr. Bennett is a member of the American Institute of Mining and Metallurgical Engineers and of the American Association of Petroleum Geologists. He has been a councillor of the American Petroleum Institute since 1924 and he was the first president of the Arkansas-Louisiana division of the Mid-Continent Oil and Gas Association. He is a director of the City Bank & Trust Company in Houston, Tex. Mr. Bennett was born in Walkersville, W. Va., in 1881 and has four children.

A. W. Clark, formerly with Stone & Webster Engineering Company, is now a vice president of General Refractories Company.

* * *

L. E. Phillips, vice president of the Phillips Petroleum Company, is inspecting the company properties in the Panhandle Field.

* * *

E. J. Sullivan, president of the E. T. Williams Oil Company, has returned to Casper, Wyo., from an extended trip to Washington, D. C.

* * *

S. L. Main of Los Angeles, Calif., was in Casper, Wyo., last week on business having to do with the Standard Oil Company of Colorado.

* * *

M. J. Norrell, public relations director of Magnolia Petroleum Company, addressed the Technical Club of Dallas on "The Bootleg Gasoline Racket."

* * *

H. G. Officer, Amerada Petroleum Corporation, Tulsa, is in Fort Worth, Tex., carrying on duties of H. E. Marsh, Texas division land man, who is on his vacation.

* * *

George F. Prussing, safety engineer of the Union Oil Company of California and manager of the Union Oil Company's building in Los Angeles, has returned to his office from Tulsa.

* * *

P. H. Vermillion, Kansas and Oklahoma representative of the National Lead Company, with headquarters in Wichita, Kans., spent a few days in Tulsa during the past week.

* * *

D. K. Bowen of Rock Springs, Wyo., was in Casper conferring with officials of the Ohio Oil Company. Mr. Bowen is associated with the Mountain Fuel Supply Company, a subsidiary of the Ohio.

* * *

H. W. Lang of Fort Wayne, Ind., was in St. George, Utah, making an inspection of the properties of Arrowhead Petroleum Corporation which is doing some development work in the Virgin oil field.

* * *

C. S. Miller, independent operator and formerly with the Tidal Oil Company at Fort Worth, Tex., has been called home to Terra Alta, W. Va., by the death of his father. Mr. Miller will be gone two or three months.

* * *

Gordon Mackenzie, who was in the oil business for several years in Southwest Texas, took time out to take a course in a law school in Tennessee. He is now back in Southwest Texas where he will begin operating again.

* * *

A son, Thomas, was born to Mr. and Mrs. Harry H. Schwartz of Casper, Wyo., May 29. Mr. Schwartz is chairman of the board of the Arro Oil & Refining Company of Lewistown, Mont., and treasurer of the Empire State Oil Company of Casper.

* * *

W. P. Near, for eight years city engineer of London, Ontario, has been appointed manager of the Toronto division of the Supertest Petroleum Corporation, succeeding R. E. McKinney, who has been transferred to an executive position in the company's head office at London, Ontario.

* * *

Scott Turner, director of the U. S. Bureau of Mines, and president of the American Institute of Mining and Metallurgical Engineers, received the honorary degree of Doctor of Engineering from the Michigan College of Mines, on June 2. He delivered the graduation address to the outgoing class, at Houghton, on the same day.

* * *

H. D. Bishop and R. W. Yarbrough, assistant attorney generals of Texas, have been assigned to the East Texas oil field by Atty. Gen. James V. Allred and will remain in that area indefinitely to make a thorough survey of the field, and investigate for the attorney general's department, assisting all forces in seeing that illegal oil production is stopped.

Field Problems and Their Solution

EDITED BY THOMAS F. SMILEY

This department is conducted in order that men connected with the drilling, producing or transporting branches of the petroleum industry may obtain aid in solving problems that confront them in their work. Readers are invited to send questions freely. These questions will be placed in the hands of persons capable of answering them authoritatively, and the answers, based on the best available information, will be published.

Each question should give as much detail as possible, especially if it involves depths of sands, types of sands and operations on adjoining or nearby properties. The source of questions will be considered confidential, and only the initials of the sender will be published. Questions involving patented processes, intricate formulas or estimates of cost cannot be answered. If an immediate answer is important, one will be given by mail when the writer requests it.

In this connection, The Oil and Gas Journal will be glad to publish articles from field men who have devised new methods or improved old ones.

RATE OF TEMPERATURE CHANGE

At what rate does the temperature of a well hole increase as the drill proceeds? That is, at what rate per foot does the temperature rise as the depth increases?—E. E. S.

It formerly was assumed for ordinary purposes that underground temperatures rise approximately 1 degree for each 50 feet of depth, but temperatures recorded in deep oil wells have shown that temperature gradients vary in different wells and in different fields. In certain wells in Pennsylvania, for instance, the temperature gradient indicated an increase of 1 degree Fahrenheit for each 58 to 64 feet of depth, and in California an increase of 1 degree for each 52 feet is often observable. Other temperature investigations show that in some districts the temperature rises at an even faster rate, often at 1 degree for each 40 feet.

In the Salt Creek Field of Wyoming well temperatures at a depth of 100 feet ranged from 51.4 to 65.27 degrees Fahrenheit, and at 2,000 feet they ran from 79 to 98.4 degrees. Temperature measurements in a well in the Teapot Dome Field, Wyoming, showed 71.6 degrees at 1,000 feet and 125 degrees at 2,867 feet. In another well in the same field the temperature at 25 feet was found to be 76 degrees, but at 2,790 feet it was 124.5 degrees. A completely dry well in the Teapot Dome Field showed a temperature of 52 degrees at 100 feet and of 101 degrees at 2,000 feet. In wells in California the temperature at 4,000 feet varied between 150 and 170 degrees. A thermometer run to the bottom of a well 4,500 feet deep in the Wellington-Fort Collins area of Colorado recorded 157 degrees. This was 3 degrees higher than that registered by a well 7,900 feet deep near Kane, Pa.

Temperature measurements made by E. M. Hawtoff, of the Bureau of Economic Geology, in a well in the Big Lake Field in Reagan County, Texas, showed the following temperatures at depths below 5,000 feet: At 5,700 feet, 122 degrees Fahrenheit; 6,500 feet, 135; 7,000 feet, 152; 8,000 feet, 161; 8,300 feet, 170.

HIGH VOLUMETRIC EFFICIENCY

There are frequent references to "high volumetric efficiency" in pumping wells, but it is not made clear just what degree of efficiency can be designated as high. May I ask what is regarded as high volumetric efficiency in a pumping well? I would like to ask also what are regarded as the chief hindrances to high volumetric efficiency.—H. O. S.

The following answer to your question is provided by Hallan N. Marsh, of the General Petroleum Corp.:

The subject of high volumetric efficiency naturally raises the question as to what percentage is considered satisfactorily high. The answer must depend upon the class of well being considered, but it appears from recent experience that actual volumetric efficiencies less than 50 per cent are rarely excusable, even under unfavorable conditions, and that under average conditions 70 and 80 per cent should be secured. Still higher values can be secured, but are not considered advisable, because without a moderate margin of displacement a small amount of pump wear will result in loss of production. A certain amount of pump slippage is inevitable; and as the amount of slippage is independent of the amount of oil pumped, its percentage effect will be greater on small wells than large wells. Likewise, leakage will be greater in deep wells than shallow wells. In extremely thick oils complete elimination of gas may be impractical, and for the present some loss of efficiency may have to be allowed for this cause. The figures mentioned certainly deserve to be called high as compared with those observed in the past and in much present practice.

High volumetric efficiency, as above defined, will be secured if the following conditions are met: (a) Tubing leakage and unnecessary pump slippage eliminated; (b) gas excluded from the pump while oil freely admitted, by the use of an adequate gas anchor, and (c) displacement of the pump suited to be desired or potential production of the well. These points will be treated in more detail one at a time.

Tubing leaks, while perhaps not common, sometimes exist and go unnoticed, especially when the pump is operated with a great excess of displacement. If there is any cause of doubt, tubing should be thoroughly tested by filling with water while in the hole or steaming in stands in the derrick. Pumps may be individually tested for slippage aboveground by connecting at the top to a source of high pressure fluid and measuring the flow of fluid out of the bottom with the standing valve removed or held open. However, sufficient test data are available, so that slippage of liner-type pumps can be approximately predicted from their fit and condition.

It appears probable that leakage through pump valves is a more common source of excessive loss than slippage past plungers. Leakage of valves in good condition is negligible, but leakage through moderately worn valves is excessive. Condition of valves can be determined by common methods of inspection.

A more important factor is gas. Pumping of gas takes power and uses up displacement that should be used to pump oil, but is unnecessary as gas will flow out through the casing, if given a chance, by the use of an effective gas anchor and small casing pressure. Many wells are operated without any anchor, and the most apparent reason for this is that many of the anchors tried have been so poorly designed as to be perhaps more of a hindrance than a help. The purpose of the gas anchor is to admit oil to the pump freely, while excluding gas as completely as possible. Free admission of oil requires short passages of large cross-sectional areas without orifices or other special restrictions. The only known principle of separating gas from oil that is applicable to this situation is gravity separation. Gas being lighter than oil will rise out of the oil if given sufficient time, and will escape and flow out through the casing if given an opportunity. This requires that oil and gas entering the anchor shall be caused to flow downward through it, without turbulence, at a velocity of less than the rate of rise of gas bubbles through oil. The length of this down-pass does not need to be very great. A further requirement is that there be a multiplicity of entrances to the anchor, the upper ones of which can serve as gas vents. It should be obvious that separated gas cannot escape through a small hole by which oil is entering. Adequate gas vents should be provided at a level considerably higher than the oil and gas inlets.

Having been assured that leakage and slippage are small and the gas anchor is effective, displacement can be reduced nearly to the desired production rate. Displacement can be reduced by any or a combination of the following methods: (a) Reducing length of stroke; (b) reducing number of strokes per minute, and (c) reducing pump diameter. Reducing length of stroke should only be resorted to if for special reasons other methods are not practical, as greater economies generally accompany the other methods.

WHY WAS IT CALLED THAT?

CRAZY WATER

Long before the first oil well was drilled in this country many spots where petroleum seeped from the ground had been found in northwestern Pennsylvania. The Indians, with their well-known faculty of inventing apt names, called the fluid "crazy water." An early record says: "In 1805 a Mr. Hays, who lived near Franklin, Pa., bought the entire amount of oil then in storage along Oil Creek, 16 bbls. General Hays, as he was called, having served under Washington in the Revolution, hauled this to Pittsburgh on packhorses, 80 miles and only trails through the forest. At one time Hays was captured by a band of Indians, who were going to scalp him and his helper. But Hays showed them how to start a quick campfire by using crazy water, as the Indians called oil that came from springs. Hays also showed them how black and shiny the braves and squaws could make their hair by rubbing oil on it, and they turned him loose."

ABBREVIATIONS EXPLAINED

Be kind enough to give me a key to your abbreviations under remarks in your column stating the status of the wells being drilled. Lately I have noticed a few abbreviations I did not understand, such as W.O.S.R., T.A., H.F.W., S.D., T.D., S.O. If you will clarify this matter for me I shall appreciate it.—C. J. E.

The abbreviations which you quote have the following meanings: W.O.S.R., waiting on standard rig; T.A., temporarily abandoned; H.F.W., hole full of water; S.D., shut down; T.D., total depth; S.O., show of oil. The Field Problems page in the issue of September 25, 1930, contains a fairly complete list of oil field abbreviations.

COMMUNITY LEASING METHOD

I would like to get some information regarding what is called a community lease, which is said to be an improvement over the ordinary lease for oil and gas development. Can you tell me something about it?—E. T. O.

The community form of lease embodies the essential provisions of the standard form of oil and gas lease, including the time-tried rental clause, but in addition it has the communal feature of operation and royalty payment. This feature is the only thing that marks it from the standard lease, but under it operators are willing to test out wildcat territory and to develop areas cut up into small tracts, a thing difficult to do under the old lease. Under the standard form offset laws compel an operator to drill uneconomic offset wells so that a neighbor will not be deprived of his rightful share of the gas. Three or four wells may be required where one would serve with greater profit. The result is a rapid pressure decline, the drowning out of the gas by salt water and the total loss of all the wells long before all of the gas has been taken out.

One well to 40 acres is regarded as the proper spacing for maximum recovery. Pipe line companies will not build costly pipe lines to localities where uneconomic lease conditions cause wells to be crowded, causing short life to the field. Under the community form of lease wells may be spaced one to the 40 acres regardless of land lines and in fairness to all.

A "community block" should include about 640 acres of land, except in strictly wildcat territory where the blocks may be larger. The lease should have a term of five years and a rental to commence at the end of the first year.

The community lease describes the land and states that it is a fractional unit in a larger area to be known as a community block which contains a certain number of acres which are clearly set forth by further description. The operator ordinarily is not allowed to have possession of the lease until he has commenced a well on some part of the block. The relation of any one lease to all the leases in the block is thus clearly established.

A separate agreement called an "escrow agreement" then is executed by both the landowners and the operator. It states that they have agreed to place the lease in escrow in a bank with instructions to the banker to return the lease to the landowner if a well is not commenced within the time limit set, say six months or a year, depending on general conditions. If the well is commenced within the time limit, the banker is instructed to deliver the lease to the operator. The operator will not go to the expense of recording the leases unless he gets valuable production. If the test well is a dry hole the operator must continue drilling more wells or pay rental in order to maintain his possession of the various leases in the block, or he will hand the leases back to the landowners, which cancels all conditions. Big companies are more apt to carry leases on a rental basis, but individuals seldom do in hard times.

The landowners in a locality need never hesitate to lease as many blocks to any one operator or promoter as he may want so long as he is willing to obligate himself to drill test wells by escrow agreement. By this means the country gains far more rapid testing because land is not tied up long for speculation.

For a more detailed description of this way of leasing you are referred to an article in The Oil and Gas Journal of November 5, 1931, by Thomas M. Galey, entitled "Community Lease Offers Better Method of Development."

Oil Industry Equipment and Supplies

NEW DESIGN OF WIZARD PILOT VALVE ANNOUNCED

The Fisher Governor Co., Marshalltown, Iowa, has announced the development of the Series 4200 Wizard Pilot unit. It involves a new design that includes the pilot valve as an integral part of the main valve top work. This unit utilizes auxiliary air or gas as an operating medium and is suitable for all pressure conditions of 5 pounds and up.

The unit is easily converted from a pressure reducing valve to a pressure relief valve by a simple change made in the pilot valve. It is furnished complete with a small auxiliary regulator shown attached and with pressure gauge.

This unit is being used extensively in refinery operations where extremely close limits of regulation must be maintained. With the new design incorporating the pilot with the main valve, the elimination of time lag so common in pilot control, has been accomplished.

NEW OXWELD REGULATORS ARE MARKETED BY LINDE

The Linde Air Products Co., 30 East Forty-second Street, New York, has added two regulators, the Oxweld type R-48 oxygen regulator and the Oxweld type R-49 acetylene regulator, to its line of welding and cutting apparatus. These are lighter duty regulators, particularly designed for use with the Oxweld type W-15 welding blowpipe in the Oxweld sheet metal welding outfit.

The bonnet is held in place by a forged brass cap ring to assure a nonleaking diaphragm. Assembly and disassembly are facilitated by the ribbed cap ring which provides an easy grip. The Monel metal stem is similar to that used in other Oxweld regulators. It is detached from the diaphragm, giving increased smoothness in the operation of the regulating mechanism. The diaphragm is made of the same rubber composition material used in other Oxweld regulators and the springs are made of cadmium-plated steel. Pressure forgings are used in the body cap ring and pressure adjusting screw. This screw has a high thread pitch which permits rapid pressure adjustment.

A new type of safety release is incorporated in the Oxweld type R-48 oxygen regulator. The hose connection of the Oxweld type R-48 oxygen regulator is for one-quarter-inch hose, and on the Oxweld type R-49 acetylene regulator is for three-eighths-inch acetylene hose. Other size hose connections can be supplied.

ALLOYED WROUGHT IRON

The Highland Iron & Steel Co., Chicago, an associate of the American Chain Co., Inc., announces that it now is in production on wrought iron alloyed with nickel, with copper, with nickel and molybdenum and with copper and molybdenum. Several years of intensive research work preceded actual production. This development of alloyed wrought iron opens fields of usefulness for this material without changing its fibrous structure which is responsible for the endurance of wrought iron under vibratory stresses, but at the same time has resulted in an increase in the strength of the material in the as-rolled condition.

NOTES ABOUT TRADE LITERATURE

The Mine Safety Appliances Co., Pittsburgh, Pa., is sending to persons who ask for it a bulletin explaining the M-S-A combustible gas indicator for testing explosive gas hazards.

A bulletin issued by the Garlock Packing Co., Palmyra, N. Y., describes the Garlock Guardian gasket, which is said to possess special resiliency.

A broadside distributed by the Continental Steel Corp., Kokomo, Ind., emphasizes the protection to property afforded by Continental chain-link fence.

"Transformers" is the subject of a 54-page loose-leaf bulletin issued by the Wagner Electric Corp., 6389 Plymouth Avenue, St. Louis, Mo. The bulletin includes all types of distribution transformers. The new bulletin is No. 172.

Standard general purpose magnetic switches are described in an 8-page bulletin published by the General Electric Co.

The International Nickel Co., New York, is distributing a reprint of an article on "Nickel Alloy Steel Castings," by A. G. Zima, which appeared originally in the Steel Founder.

A four-page bulletin issued by the Foxboro Co., Foxboro, Mass., gives information about the company's new device, the "level stabilog," designed to control flow while it controls the level.

A new bulletin has been issued by the Bonney Forge & Tool Works, Allentown, Pa., on Bonney weldolets and thredolets. It contains a description of the engineering principles of these welding fittings besides working data, tables of sizes, and illustrations of typical installations.

IMPROVED HYDROMETER OFFERED BY DEARBORN

The Dearborn Chemical Co., Chicago, is introducing an improved concentration hydrometer for determining total dissolved solids in boiler water, which has several distinctive points. This new instrument consists of only one float and one tube, all scales being enclosed in the float.

The hydrometer is quick acting because of a mercury thermometer being used, and the space between the tube and the float permits the float to rise more rapidly. The float is provided with substantial projecting knobs to prevent friction of float against tube.

The instrument is compact, requires no special care in operation and will stand rough handling because of the single tube design. Danger of float stem breakage is eliminated. The instrument may be taken apart easily for cleaning. It is never necessary to remove the rubber bulb. The float is withdrawn from the jar or tube by removing the lower rubber fitting. The outer rim of this fitting is hexagonal which prevents the instrument from rolling when at rest. The float can be removed from the assembled instrument and operated in a separate container if desired.

The American Cable Co. has licensed the Wickwire Spencer Steel Corp. to manufacture preformed wire rope under the American Cable Co.'s patents.

KENNEDY HAS NEW LINE OF RISING-STEM VALVES

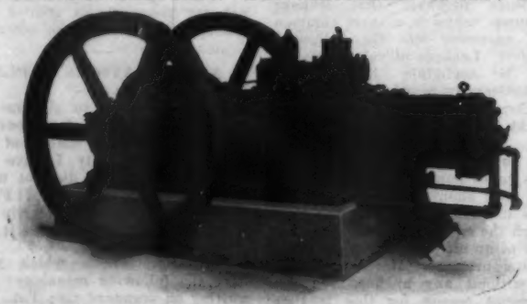
The Kennedy Valve Manufacturing Co., Elmira, N. Y., has placed on the market a new line of rising-stem bronze gate valves for 125-pound steam pressure and 175-pound water pressure.

The solid wedge disc mechanism of these valves is the same as used for many years in the standard Kennedy stationary-stem bronze gate valve. This mechanism is simple and has no small quick-wearing parts. A flexible connection is provided between the disc and the stem so that the stem will not bind or spring when the valve is closed. The stem is made of a bronze composition with high tensile and torsional strength, and has a large number of contact threads in the bonnet.

The bonnet hexagon has been made extra large and close to the body so that when a wrench is applied for installing or disconnecting, there will be no danger of distorting the bonnet. Additional features of this new Kennedy design are the deep stuffing box with gland and square section molded packing rings, the large nonheating malleable iron hand wheel which is secured to the stem by a nut, and the heavy, wide pipe end hexagons with a generous number of threads.

The Southwestern Construction Corp., Tulsa, has moved its offices to 711 World Building.

CLARK ANNOUNCES NEW CONVERTIBLE 40-H.P. DIESEL



The illustration shows the new convertible 40-horsepower Diesel pumping engine put on the market by the Clark Brothers Co., Olean, N. Y. A bulletin describing the engine in detail has been prepared by the company. It contains also tables on fuel consumption, horsepower, etc., and illustrates the convertible oil and gas features of the new engine.

CONVERTIBLE SHOVEL IS INTRODUCED BY BUCKEYE

A new seven-sixteenths-yard Buckeye convertible shovel has been announced by the Buckeye Traction Ditcher Co., Findlay, Ohio, a shovel big enough to handle most jobs where a one-half-yard shovel would be used, yet having the ease

of handling characteristic of a three-eighths-yard machine. The spring stop shock absorber is said to eliminate swing clutch slippage and shock to relative parts at the moment of reversing.

The machine is engineered with the requirements of different jobs in mind. Power for tough digging has been combined with a range of speeds especially valuable in backfilling, dragline, clamshell or crane service. A two-speed gear reduction unit provides a choice of two speeds for every operation. An additional two-speed selective gear-shift for the hoist drum makes correct drum speed simply a matter of choice. Cable drums have a capacity of approximately 200 feet of five-eighths-inch cable. The full length alligator traction units controlled independently by two reversing clutches and independent brakes provide maneuverability. Ground pressure of less than 10 pounds per square inch on the treads gets the Buckeye over soft ground. The machine travels and is easily steered with the rotating base in any direction. In low gear it climbs the ordinary practical working grades easily. All controls, including engine throttle and gear shift are conveniently located within easy reach of the operator's seat.

All shafts are rigidly supported by bearings mounted on finished cast steel bases. Drive shafts controlling rotation, traction and boom hoist are mounted in Timken roller bearings. Twin disc clutches provide accurate control. Adjustment at one point on each clutch assures uniform contact of friction discs. Chain drive from the fulcrum of the boom for the positive type crowd mechanism of the shovel gives definite control of the dipper stick at all angles of operation. Power is supplied by a 4-cylinder, 4½"6¼" heavy tractor-type Waukesha motor, developing 50 horsepower at 1,200 r.p.m.

NEW LINE OF WELDING RODS

The Bastian-Blessing Co., 240 East Ontario Street, Chicago, has introduced a new line of welding rods and electrodes, including high-speed and high-test materials. Bundles are identified by a distinctive shield tag in red and black. A new catalog in pocket size not only gives a description of each rod but gives information in reference to the proper rod for specific applications. It also contains tables for the welder and welding engineer.

CLASSIFIED WANTS

Read by Oil Men Everywhere

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The rates for Classified Advertisements are 35 cents a line for the first insertion and 25 cents a line for each additional inserton. Six words usually constitute a line. The following table will enable you to figure the cost of your advertisement:

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4 lines	1.40	2.40	3.40	4.40
5 lines	1.75	3.00	4.25	5.50
6 lines	2.10	3.60	5.10	6.60
7 lines	2.45	4.20	5.95	7.70
8 lines	2.80	4.80	6.80	8.80
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10 lines	3.50	6.00	8.50	11.00

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Compute white space at the above rates. Mail your Classified Advertisement to

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

FOR SALE—EQUIPMENT

200 AMP. General Electric Arc Welder; portable; 220 V. 3 ph. 60 cy. Complete. Like new. $350. 7x6 Ingersoll-Rand Type ER-1 Air Compressor. Like new. $225. 8x6 Ingersoll-Rand Type ER-1 Air Compressor. Like new. $250. 36"x18' Fifield Screw Cutting Lathe. $650. Also large stock of lathes, shapers, pipe machines, bolt threaders, etc. Send for our list. Terms to suit.
CINCINNATI MACHINERY & SUPPLY CO.
26 West Second St., Cincinnati, Ohio.

FOR SALE—One new magnetometer. Address 608 Royal Palm Hotel, Detroit, Michigan.

FOR SALE—AT DISCOUNT
New WKM deep well winch mounted on 15-30 McCormick-Deering tractor.
1—New 310 Unit Shovel, complete with crane and shovel attachment.
1—New WKM Pipe Line Boom and Backfiller, mounted on model GH Trackson McCormick-Deering.
1—Rebuilt Barber-Greene Pipe Line Special Ditcher.
1—15-Ton Crawler wagon—demonstrated only.
Browning-Ferris Machinery Co.,
Dallas, Texas

If you can't find the kind of equipment you are looking for, insert an ad of your own, telling of your needs.

BUSINESS OPPORTUNITIES

OFFER 1,025 acres Southwest Metcalfe Co., Ky., and drill three wells to Corniferous most reasonable sum for half interest. Checks o.k. for both oil and gas. 20 year leases. 10c rental. Or will sell acreage outright. P. E. Tichenor, Evansville, Ind.

CAPITAL—Organizer with good connection will undertake the financing of first class oil or mining project—property and management must bear rigid investigation. Address Box F-202, The Oil and Gas Journal, Tulsa, Okla.

SPECIALTY OIL BUSINESS Central Texas netting $275.00 monthly above operating expenses. Business growing steadily. Has no indebtedness. $2,500.00 cash, no terms or trades considered. Address Box F-203, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE
Kettleman Hills Field, California. 80 acres fee land within 1½ miles of Felix and Shell-Dixon wells for $150.00 an acre. Box 412, San Luis Obispo, Calif.

WANTED—Partner with some capital to lease a block of land for oil and gas in Kentucky. B. S. Kelley, 218 E. 7th St., Owensboro, Ky.

BUSINESS OPPORTUNITIES

WANTED—Brokers and salesmen in all the Cities in U. S. and Canada to cooperate with me in selling producing and nonproducing royalties at the right prices, located in the hot areas in Oklahoma, Kansas and Texas. Chances for big profits; send today for lists and maps. James R. Haynes, Grantville, Kansas.

OIL located before drilling. Geophysical method. Topgodometer Instrument; take pay in oil. No oil, no pay, except traveling and testing expenses. 95 per cent accuracy. O. P. Coffin, Caddo, Tex.

SITUATIONS WANTED

WANT POSITION—Oil, gas and mineral locator; I guarantee satisfaction or no pay. Frank Draper, Seymour, Iowa, R. No. 3.

GRADUATE petroleum chemist and refinery engineer familiar with modern refinery practices. Experience includes pipe stills and treating light and lube oils. Address Box F-201, The Oil and Gas Journal, Tulsa, Okla.

GRADUATE Mechanical Engineer wishes position. Unlimited experience in all phases of refinery construction. Experience covers United States, West Indies and Russia. Best of references. Available immediately. Write or wire M. H. Compo, Apt. No. 8, Westport, Conn.

NATURAL Gas Executive—Technical training middle western university, age 39, fourteen years' experience supervising drilling operations over 400 wells, large pipe line and compressor station construction and operation, market surveys, property appraisals, familiar with oil and gas law and accounting methods, desires permanent connection. Address Box F-210, The Oil and Gas Journal, Tulsa, Okla.

MONEY RAISING

JAMES E. MILLER CO. will co-operate with responsible firms or parties seeking aid in financing projects of higher order. 207½ East Third Street, Tulsa, Okla.

FINANCE YOUR OWN project with shares bonded. Quickest, most satisfactory known method of raising capital. Information free. Bankers Interstate Security, Electric Bldg., Denver, Colo.

JOHN MORRIS, 3608 WARREN ST., PHILADELPHIA, Pa., invites full facts first letter from capable parties planning negotiation of reasonable capital support for undertakings distinctly of higher order. Use registered mail, safeguard data.

DO YOU NEED MONEY for organizing or financing oil or mining deals? Write 2443 N. W. 12th, Oklahoma City.

CAPITAL—Our distributing facilities are broad enough to handle all types of issues, both large and small, for those desiring capital through the sale of securities.
BROOKWORTH,
110 East 42d St., New York City.

MONEY RAISING
Have clients who are interested in refinancing large partially developed producing oil and gas properties or oil company with refinery, production, etc. Submit complete data first letter. William Sacks, Title Guarantee Bldg., St. Louis.

AID IN Financing and preparing your set-up for presentation, also list your venture for sales inquiries—$25, no other fee. Adv. & Sales Bur., 10 S. LaSalle St., Chicago, Ill.

RANCHES AND FARM LANDS

FOR SALE—43,900-acre ranch. Presidio County, Texas, at $3.50 per acre patented basis. Address: A. J. Bogel, Box "N," Marfa, Texas.

OIL INDUSTRY PRINTING

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

INCORPORATIONS

CHARTERS — Delaware best, quickest, cheapest, most liberal. Free forms. Colonial Charter Co., Wilmington, Del.

PATENT ATTORNEYS

REGISTERED PATENT ATTORNEYS
United States and Canada
Before disclosing your invention to anyone, send for blank form,
Evidence of Conception.
Bulletin "How to Establish Your Rights" and complete information free.
LANCASTER, ALLWINE & ROMMEL
Suite 418-815, 15th St., N.W.,
WASHINGTON, D. C.

FOR SALE—MAPS

WRITE FOR Map and information of the big oil development program. East Arkansas. Two wells drilling. Several locations made. Feild and Jones. Oil operators. 338 Gazette Building, Little Rock, Arkansas.

ROYALTIES—PRODUCTION

MONTHLY INCOME-PAYING Royalties under Oklahoma City and Seminole Wilcox Sand wells offered. W. E. Cook, 342 Court Arcade, Tulsa, Oklahoma.

ROYALTIES in the territory of coming big development in Kansas, Stafford, Barton, Ellsworth, Kingman and Stevens Counties, core drilled. Also producing royalties. Special service to brokers. Send for list. James R. Haynes, Grantville, Kans.

UNUSUAL OPPORTUNITIES
FOR ROYALTY INVESTORS
AND DISTRIBUTORS

THE MERCURY COMPANY
Philtower Building, Tulsa, Oklahoma

JAMES B. McANALLY

Speculative & Investment Royalties

Hunt Bldg., Tulsa, Oklahoma

A service devoted exclusively to supplying opportunities to live wire brokers and dealers.

Information to Investors with address of nearest dealer on request.

CHEAP ROYALTIES—Shell-Humble midwest Blocks, Kans., Okla., Texas. Big list, agents wanted. Harry Haynes, Grantville, Kans.

ROYALTY and leases Goliad County, Texas, close up to Humble location on huge core drilled block. James R. Haynes, Grantville, Kansas.

A little ad in these columns will bring you new clients and new contacts at a very low cost. Send us your copy now.

PRODUCING OIL ROYALTIES
Henry S. Severson, Court Arcade,
P.O. Box 1341, Tulsa, Okla.

Dealer in Odd Lots
PRODUCING OIL ROYALTIES
I Buy and Sell
John L. Dickson, Box 1114, Tulsa, Okla.

STANOLIND CHASE, TEXAS SANDLIN, GYPSY GRAY, quoted dealers. Plats data and full information. W. E. Cook, 342 Court Arcade, Tulsa, Okla.

AUTHENTIC Reports Oklahoma City and Greater Seminole Fields. Price $5.00 per month. Clyde Kelly, 608 Perrine Bldg., Oklahoma City, Okla.

WANTED

OIL WANTED—Small refinery desires purchase oil in North Louisiana, Seminole, Okla., East Texas fields or other good crude that could be economically transported to plant. Standard Petroleum Products, Amite, La.

CLASSIFIED DISPLAY RATES

The rate for Classified Display Advertising set in similar style to this Ad or in two Column style is as follows for each insertion:

1 inch	1 time	$5.00
1 inch	13 times	4.50
1 inch	26 times	4.00
1 inch	52 times	3.50

Rates for Classified without display shown on opposite column.

One point borders and ten point capitals are allowed, larger type not accepted.

Changes in copy must be in our office 10 days in advance of publication date.

Mail your advertisement to the Largest Classified Section in the Oil Industry.

THE OIL AND GAS JOURNAL
TULSA OKLAHOMA

LEASES—PRODUCTION

10 to 160 ACRES near East Texas operations $2.50 to $10 likely to be worth $500 acre shortly. You can make plenty money if buy right class property. E. Croft, Proctor, Texas.

10,000 ACRES for 3,500-ft. well Yalobusha County, Mississippi. Best wildcat structure entire United States. 1 yr. free, 25c rentals. 223 Court, Memphis, Tenn.

MR. BROKER AND INVESTOR
Inquiries for leases, Royalties, Drilling Blocks and Oil Payments solicited. W. R. Miller, 1216 Hurley Ave., Ft. Worth, Tex.

TEXAS PANHANDLE Gas Production and Royalties is my Hobby—get my prices. Wire or write. E. B. Reeves, Box 13, Alanreed, Gray County, Texas.

FOR SALE
Several thousand acres of mineral rights, covering one-half of the oil and minerals on the land. For sale on the basis of $500 per quarter, for one-half of the mineral rights thereon. They are perpetual and participating. Located in Hodgeman, Trego, Ford, Kearney, Seward and Haskell Counties, Kansas. Also have several commercial blocks on good structure, and several drilling blocks. Brokers and Promoters do not answer. Write P.O. Box 471, Dodge City, Kansas, for further information.

NEW MEXICO Oil Leases, Lands and Royalties. Free State Map and information. Roy G. Barton, Clovis, New Mex.

HAVE several thousand acres POTASH lease located Southeast New Mexico, wish to make connection with party to core drill this. Roy G. Barton, Box 191, Clovis, New Mexico.

HUTCHINSON COUNTY, TEXAS—Would lease 80 acres, half mile from production, on contract to drill at once. Bonus out of oil & gas—no cash. Address Box F-192, The Oil and Gas Journal, Tulsa, Okla.

HAVE YOU ever stopped to think of the time, money and worry connected with a dry hole? If in doubt about your location, have it tested. No oil or gas, no pay, but traveling and testing expeness. Wm. F. Lehman, 1052 Welfer St., Pittsburgh, Pa.

MY METHODS proving largely successful locating gas and oil before drilling, references furnished, correspondence cheerfully answered. Address E. Fackler, 4020 Walnut, Kansas City, Mo.

Do You Believe It?

We can furnish you every thing you need in rotary or cable tools and equipment, either new or used, at prices always as low as competition and in many cases lower.

And What's More every sale backed by Bridgeport's 24 Hour Service, Dependability and quarter century record of making sure that every sale brings complete satisfaction to the customer.

Make Us Prove It!

Wire or phone us collect—or write us—at any of our branch stores, or the home office at Wichita, Kansas, and give us a chance to tell you what we can furnish you, and the price.

The Bridgeport Machine Company
Wichita, Kansas

Branches at Kilgore, Camps and Pampa, Texas; Oklahoma City, Okla.; McPherson and Russell, Kansas

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